Vol. 133, No. 5 November, 1930

AMERICAN
GAS JOURNAL
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Including GAS INDUSTRY Est. 1900

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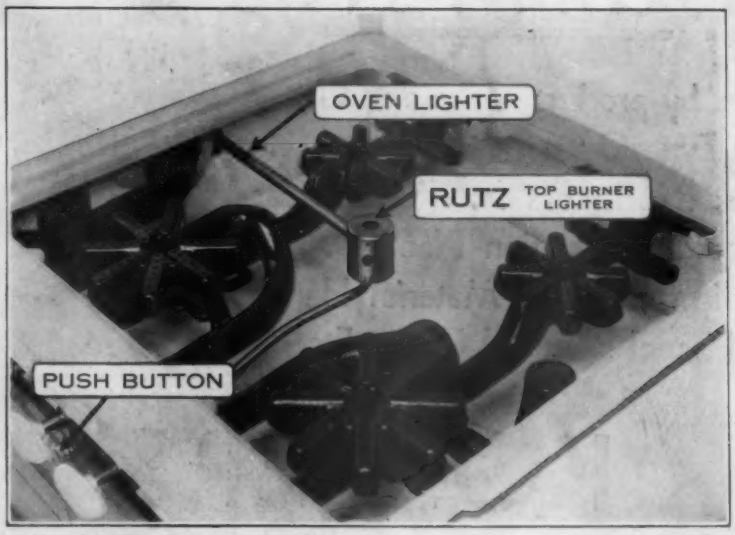
Low in price
Easy to install
Amazingly reliable



New
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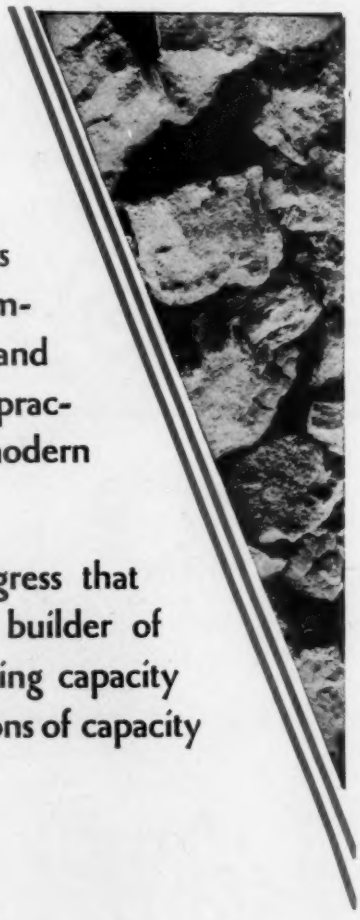
MILWAUKEE GAS SPECIALTY CO. . . . . MILWAUKEE

ENDURING FITNESS



The operators of by-product coke and gas plants built by Koppers are assured of a comprehensive service by a company closely and permanently identified with by-product practice—a valuable aid in keeping plants modern and fit.

Koppers Service expresses the progress that necessarily accompanies its roles as builder of 76,000,000 tons of coal carbonizing capacity and operator of over 7,000,000 tons of capacity per year.

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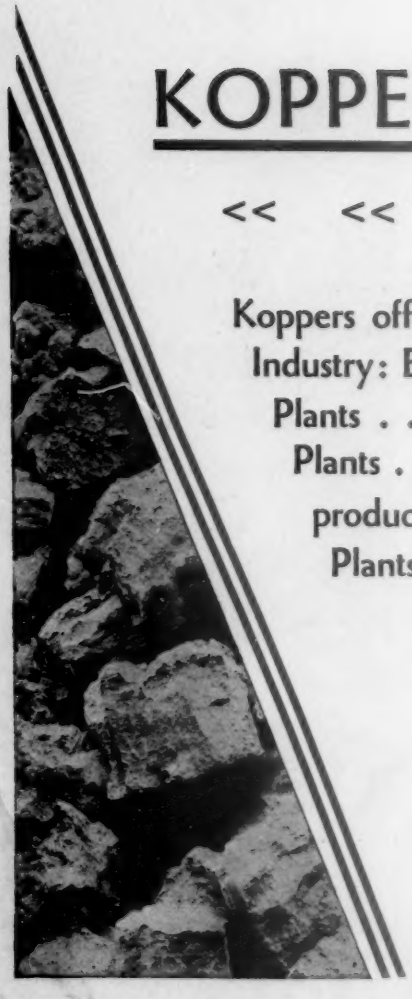

Koppers offers the by-product Coke and Gas Industry: Becker Type Oven Plants . . . Benzol Plants . . . Gas Producers . . . Water Gas Plants . . . Liquid Purification Plants . . . By-product Equipment . . . Material Handling Plants . . . Phenol Removal Plants, Etc.

KOPPERS CONSTRUCTION COMPANY

KOPPERS BUILDING PITTSBURGH

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900
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H. M. RILEY, *Editor*
R. S. MCBRIDE, *Consulting Editor*, Washington, D. C.

Vol. 133, No. 5 November 1930 Whole Number 3683

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AMERICAN GAS JOURNAL, November, 1930, Vol. 133, No. 5 Published monthly by American Gas Journal, Inc., at 34 Crystal St., East Stroudsburg, Pa. Executive, Editorial, and Business offices at 53 Park Place, New York, N. Y. Entered as second-class matter, October 17, 1928, at the postoffice of East Stroudsburg, Pa., under the Act of March 3, 1879.
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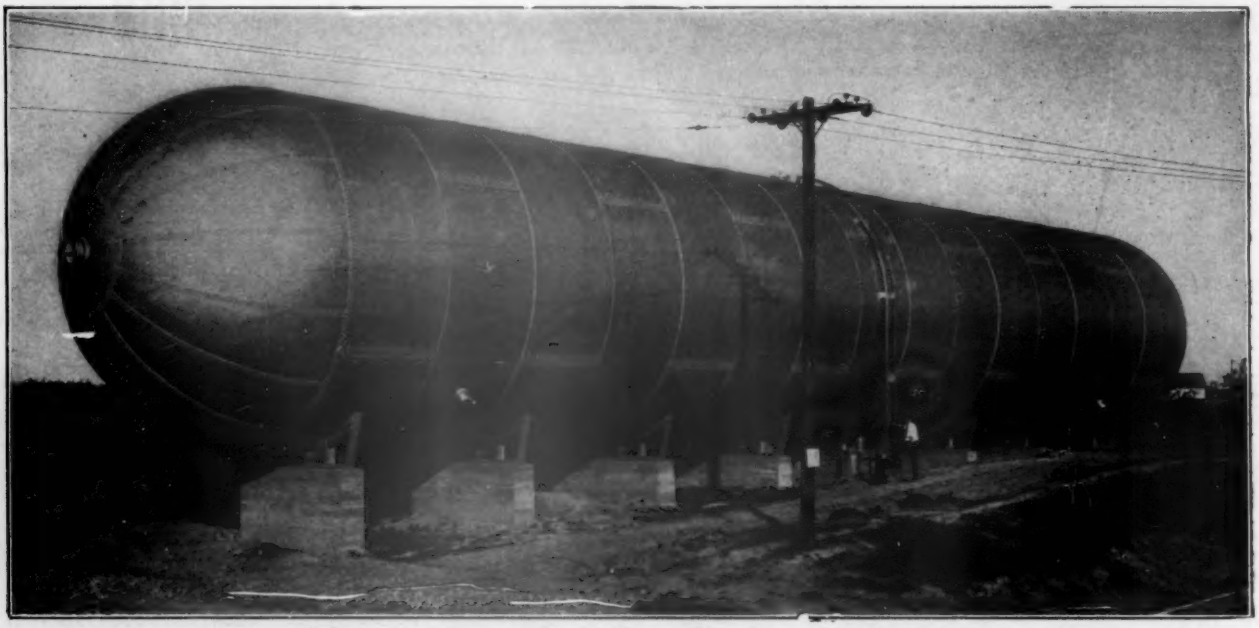
The Builders of Stacey Holders for Over 79 Years



High and Low Pressure Gas Holders to Meet Every Requirement

We believe that the present time is most advantageous for the placing of contracts for either low or high pressure gas holders, due to the fact that the price of steel, entering into their construction is particularly favorable to the buyer, and shop fabrication can be performed during the winter months at a low cost, which will effect substantial savings.

We would appreciate an opportunity of discussing this matter with you.

STACEY SINCE 1851

THE STACEY MANUFACTURING CO.

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NEW YORK OFFICE:
52 Vanderbilt Avenue

AN INDEPENDENT ORGANIZATION
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NOTE THE IMPROVEMENTS IN THIS NEW SEMET-SOLVAY CHARGING MACHINE

Fuel capacity 20 cu. ft., sufficient for one charge per cycle on the largest generator.

Lever scale accurately controls weight of the fuel charged. Number of chargings are recorded.

Shortened drop and slope of hopper protects fuel against breakage. Brick lining and wearing plate protect the inclined surface against wear. Weigh hopper can be adapted to any plant layout.

All packing glands are outside the machine, permitting easy servicing, preventing leakage and protecting gland packing from contact with hot gases.

Spreader deposits fuel away from the center of the generator. Brass-sleeved spreader shaft reduces wear and minimizes packing maintenance.

The sequence of steps in the charging operation is assured by an electrical timing device for absolute safety and dependability.

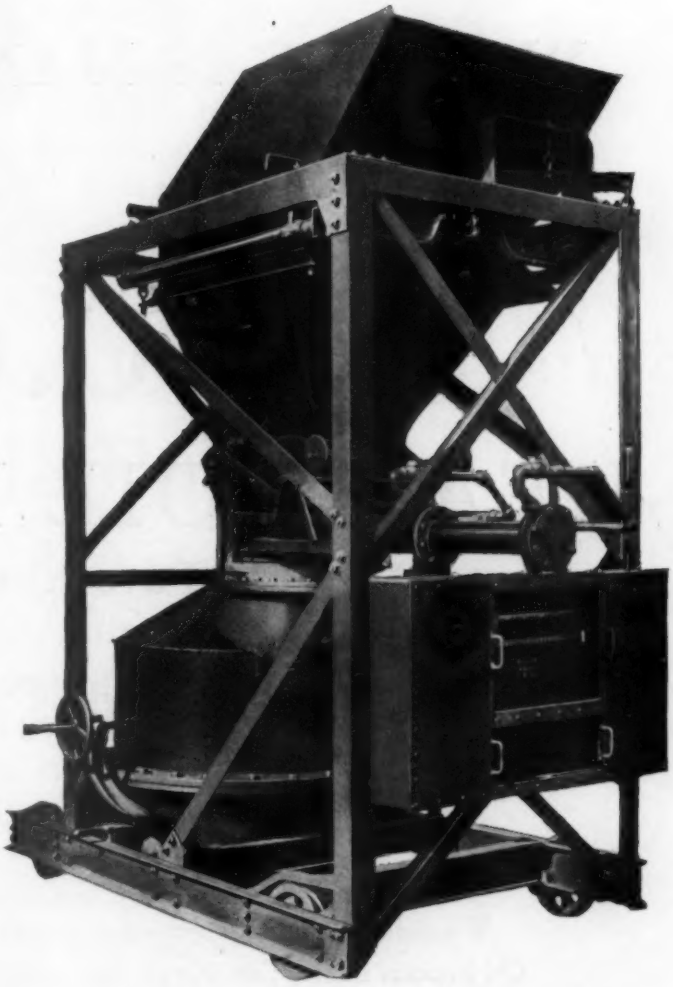
Reduced headroom simplifies installation.

Roller bearing wheels permit easy moving of the machine.

The rigid framework assures smoothness of operation for every working part.

This new type Semet-Solvay Charging Machine will fit your water gas generator. It provides operation that is completely mechanical and can be perfectly controlled to meet required cycles.

Further details, specifications and quotations, based on your layout, are furnished without obligation.



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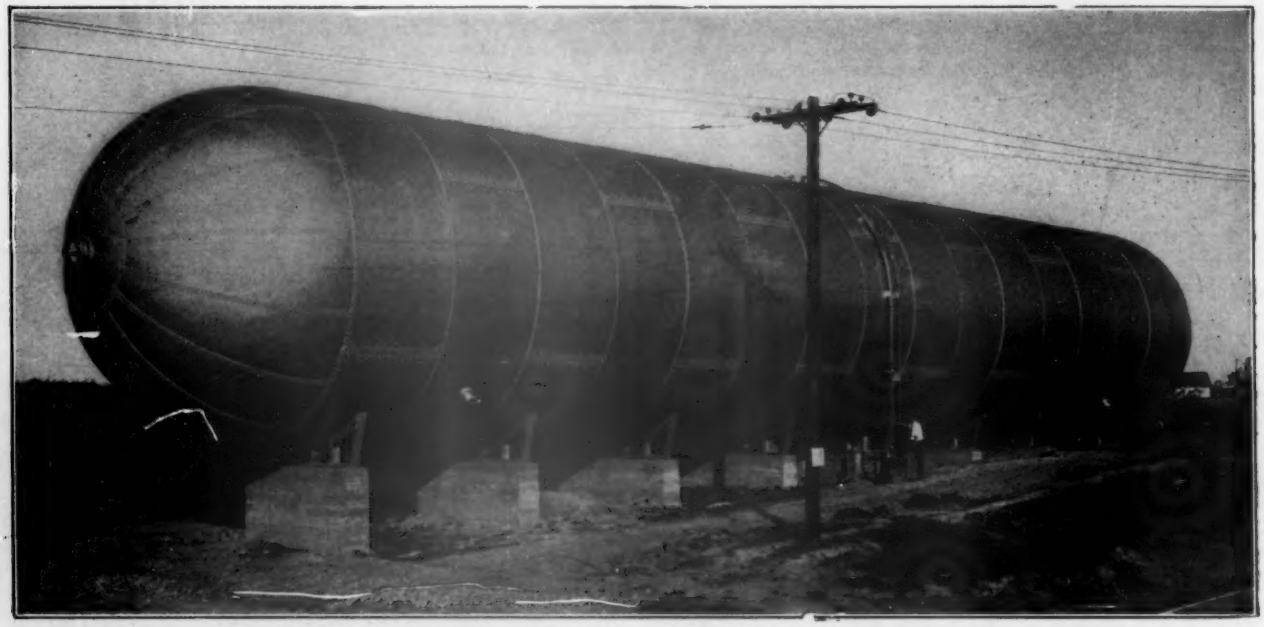

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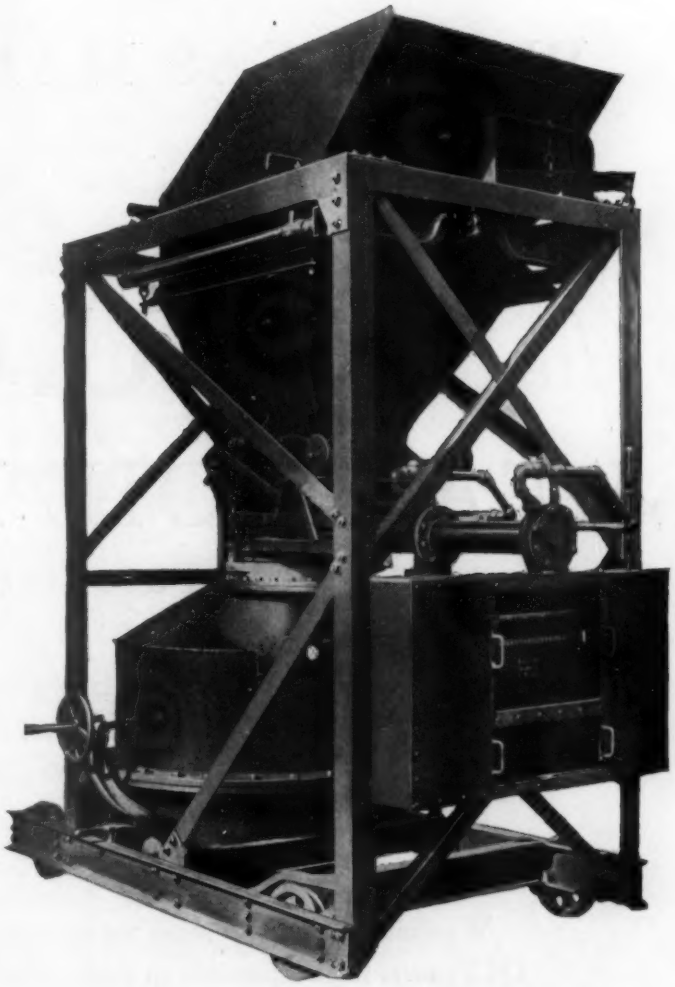

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THE OUTSTANDING DEVELOPMENT IN CARBURETTED WATER GAS MANUFACTURE

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THE U.G.I. HEAVY OIL PROCESS

(Patented)

As successfully used at Philadelphia, Newark, Atlantic City, Norwalk and New Haven, Conn., and Long Branch, N. J.

* * *

We shall be glad to discuss the savings which the U. G. I. Heavy Oil Process makes possible in your plant.

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Now Under Construction
227 Mile Pipe Line
from Reading, Pa., to Syracuse, N. Y.
for
SUSQUEHANNA PIPE LINE COMPANY
SUBSIDIARY OF SUN OIL COMPANY

Because of our experience, adequate use of the latest equipment, and our form of contract whereby 100% of all savings revert to the client—we are building pipe lines and gas distribution systems at low cost.

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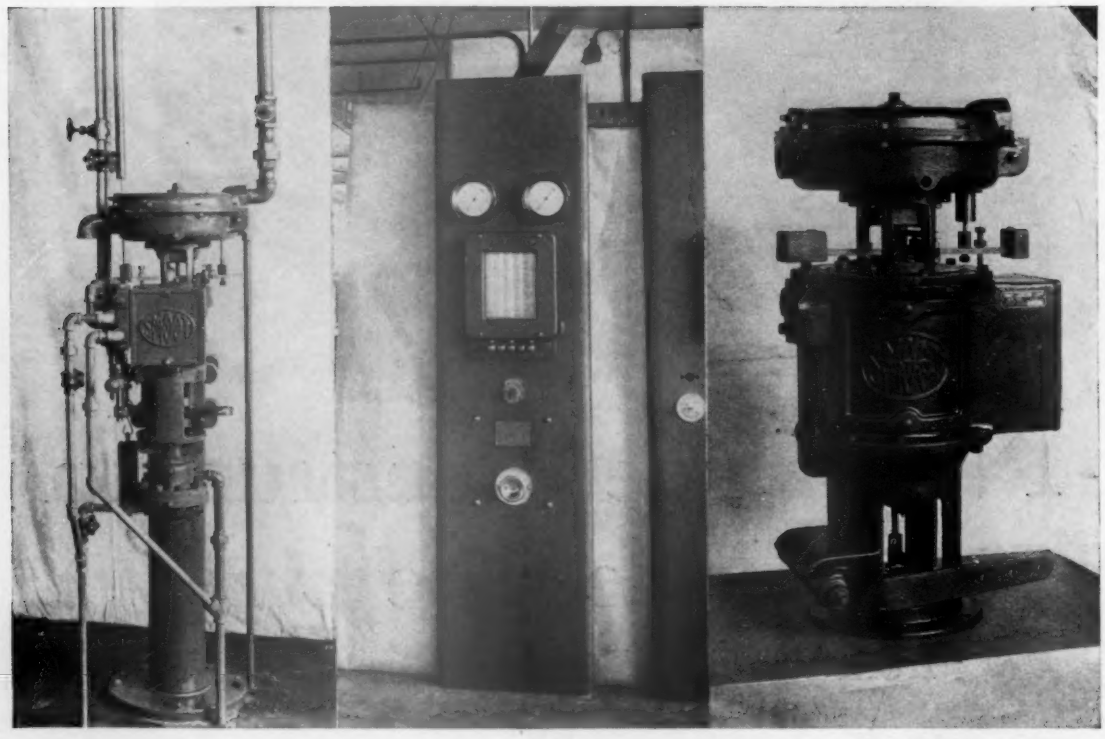
MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED

SMOOT CONTROL OF GAS MIXING



Smoot Piston Type Gas Mixer Regulator

Smoot Gas Mixer Ratio Panel
The operator may instantly change the amount of any of the gases in the mixture at this panel.

Smoot Gas Operated Gas Mixer Regulator

A LARGE GAS MIXER

A prominent steel company has ordered Smoot Control for what is believed to be the largest gas mixer in the world.

This gas mixer will mix a maximum flow 200,000,000 cu. ft. per day of by-product oven gas with 50,000,000 cu. ft. per day of natural gas. Pressure regulation is also included.

This gas mixer will operate on the Smoot Volumetric principle with fast, stable mechanical regulators.

Smoot Engineering Corp., 136 Liberty St., New York

SMOOT CONTROL

SIDE-STEPPING THE DANGER POINTS

IT can't be done. Sooner or later the "danger points" in your plant must become all too apparent and then their elimination most likely will cost a good round sum.

A thorough survey such as we make is a sure safeguard against the too close approach to the danger point. This survey is made by men well versed in every phase of gas making with the experience and accumulated data of over a quarter century in gas plant design, construction and operation to draw from.

A great deal depends upon the result of this survey as to what is necessary to ward off the danger points and bring your equipment and operation up to maximum efficiency whereby the entire plant can be operated at the minimum cost.

It may be possible for our men to lay their finger on the trouble spots instantly or perhaps later developments will show a more complicated state of affairs, but you can rest assured they will be brought out eventually by our staff and a remedy suggested.

Call on us at any time; the investment will prove a profitable one.

MAIN OFFICE — 24 STATE STREET,
BATTERY PARK BLDG., NEW YORK

BRANCH OFFICE—205 W. WACKER DRIVE
ENGINEERING BLDG., CHICAGO, ILL.

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A NEW

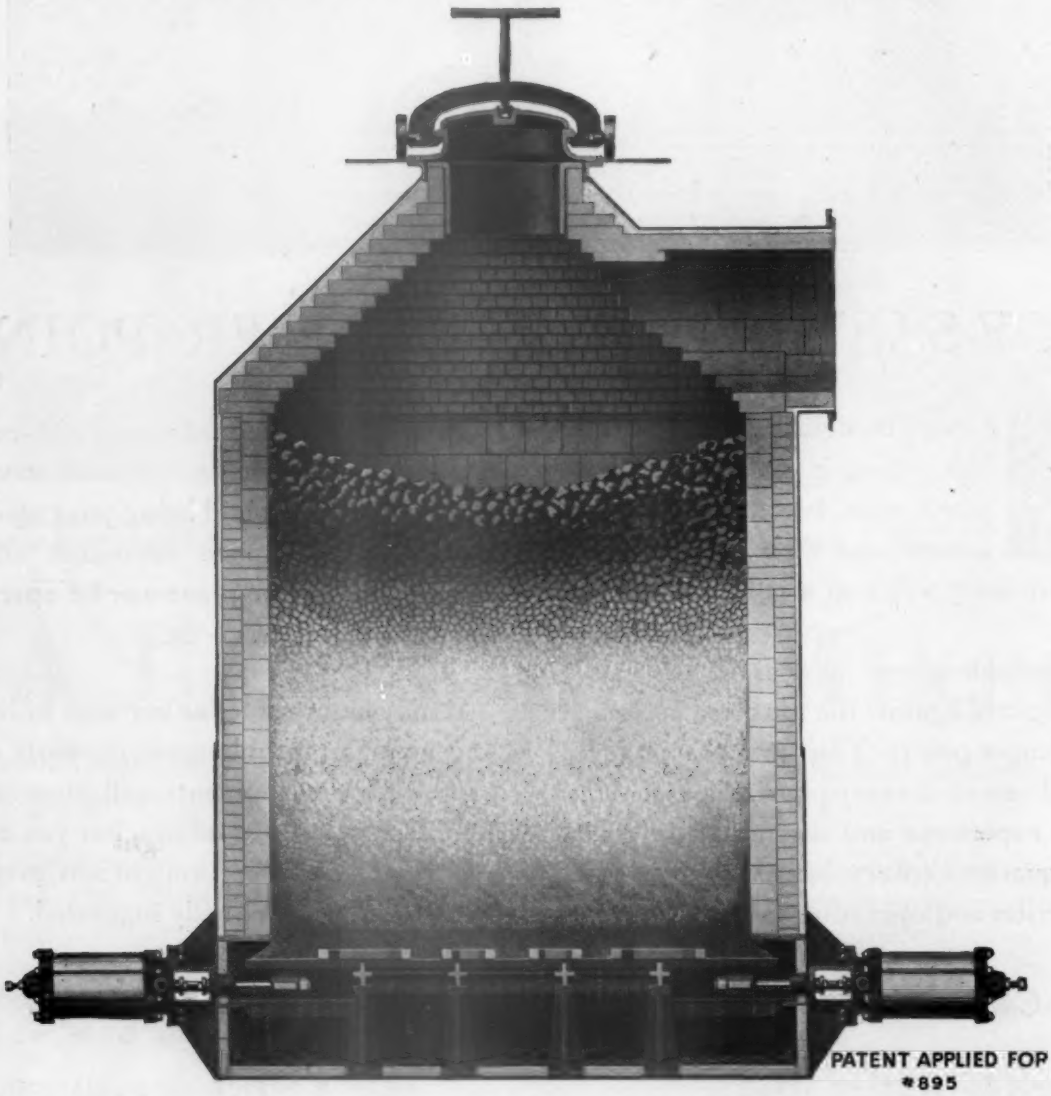
MECHANICAL GRATE

For Large or Small Sets

Simple in Design *Rugged in Construction*

Low Initial Cost

A PROVEN SUCCESS!



We will be pleased to explain this grate

BUILT BY

THE GAS MACHINERY COMPANY

1900 Euclid Avenue, Cleveland, Ohio

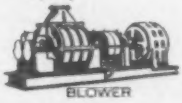
METER

STACEY BROTHERS

GAS PUMP

STACEY "BULLET"

TAR PUMP


BLOWER

Service Demanded Service Received

COMMUNITIES grow, send-out increases, yet absolute dependability of the gas supply is demanded—and obtained.

Likewise, the industry demands dependability from its equipment—and receives it from The Stacey Engineering Company.

Station and industrial meters, gas pumps, boosters, exhausters, blowers and "cycloidal" pumps are the *rotary positive* units that reduce losses and lower the operating costs.

Holders, Stacey "Bullets," pressure tanks, scrubbers, purifiers, penstocks, stand pipes, condensers and steel plate construction complete the service that our organization offers *within the industry*.

Our engineers at any of our offices will be glad to explain why, in The Stacey Engineering Company, *Service Demanded* and *Service Received* are the same.

ROOTS

WILBRAHAM-GREEN

CONNERSVILLE

12TH ST. & COLUMBIA AVE.
CONNERSVILLE, INDIANA

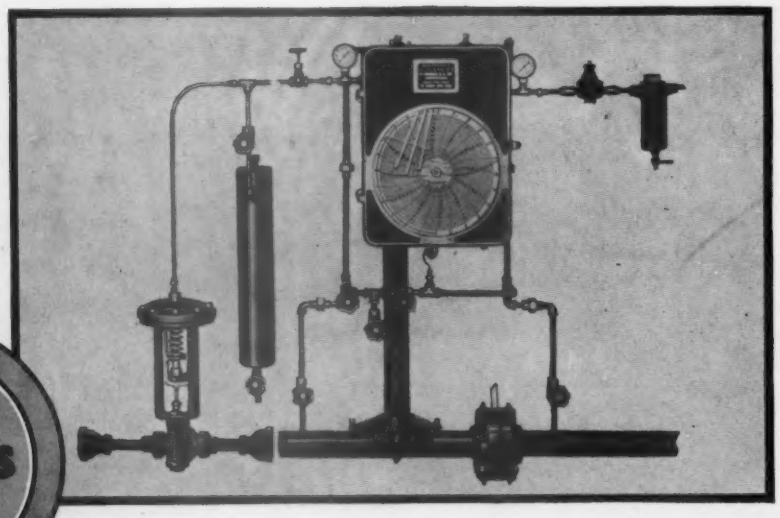
STACEY BROS.
GAS CONSTRUCTION COMPANY

5535 CARTHAGE PIKE
CINCINNATI, OHIO

420 Lexington Avenue
New York City

20 North Wacker Drive
Chicago, Illinois

(Comprising)
THE STACEY ENGINEERING COMPANY



A DOZEN APPLICATIONS

Indicate the Wide Range of Important Uses

THE Metric Rate Volume Controller makes the constant control of volume as certain and as satisfactory as the constant control of pressure has already been made by the use of high-type regulators.

A new application of the controller is the proportional control of two gases, or a gas and a liquid. The Metric Rate Volume Controller also fills a need for controlling the percentage volume of one liquid relative to the other.

A dozen applications in oil and gasoline processes indicate the wide possibilities for use in other fields.

REFINERY APPLICATIONS

Controlling rate of oil charged to each crude distillation unit, to each cracking unit, or to each steam still. Controlling amount of steam used in steam still. Controlling rate of crude medium to each tower. Individual volume control of acid or caustic flow in connection with "continuous treaters," for light distillate such as gasoline.

NATURAL GASOLINE PLANT USES

Controlling rate of flow of absorption oil sent to the absorbers, gas sent to the absorbers, oil to the still, lean oil from the still, steam to the still, or oil charge to kettle in gasoline stabilization.

Write us for the specific data you need.

AMERICAN METER COMPANY
INCORPORATED
The World's Largest Manufacturers of Gas Meters and Allied Apparatus
ESTABLISHED 1836
GENERAL OFFICES : 105 W. 40TH STREET · NEW YORK, N.Y.

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SERVICE LOS ANGELES · NEW YORK · PHILADELPHIA · PITTSBURGH · SAN FRANCISCO · TULSA

One-piece Ironcase Casting

Eliminates the possibility of Internal Case Leaks

OF GREAT IMPORTANCE to the accuracy of any displacement meter is the construction of the case. In Metric Ironcase Meters, the valve table, partition and channels are cast as an integral part of the body. There can be no internal leakage between measuring compartments.

Even a minor internal leak can make a meter incapable of measuring a pilot light load. For that reason, all meters are given a rigid low fire test before leaving our factory. And the test record of Metric Ironcase Meters with their leak-proof one-piece bodies, proves convincingly the value of this important structural improvement.

The one-piece principle of Metric construction is illustrated by the cross-sectional view of the 5-B body casting. This advantage is available in every Ironcase meter which includes 5-B, 10-B, 20-B, 25-B, 30-B, 35-B, 60-B, 80-B, 250-B, and 500-B.

Write for our Ironcase Catalog EG-40.

AMERICAN METER CO. MEASUREMENT ENGINEERS CUBIC FEET

METRIC METAL WORKS
ERIE, PENNSYLVANIA
Ironcase, Tinned Steel Case and Orifice Meters

AMERICAN METER COMPANY
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The World's Largest Manufacturers of Gas Meters and Allied Apparatus
Established 1836

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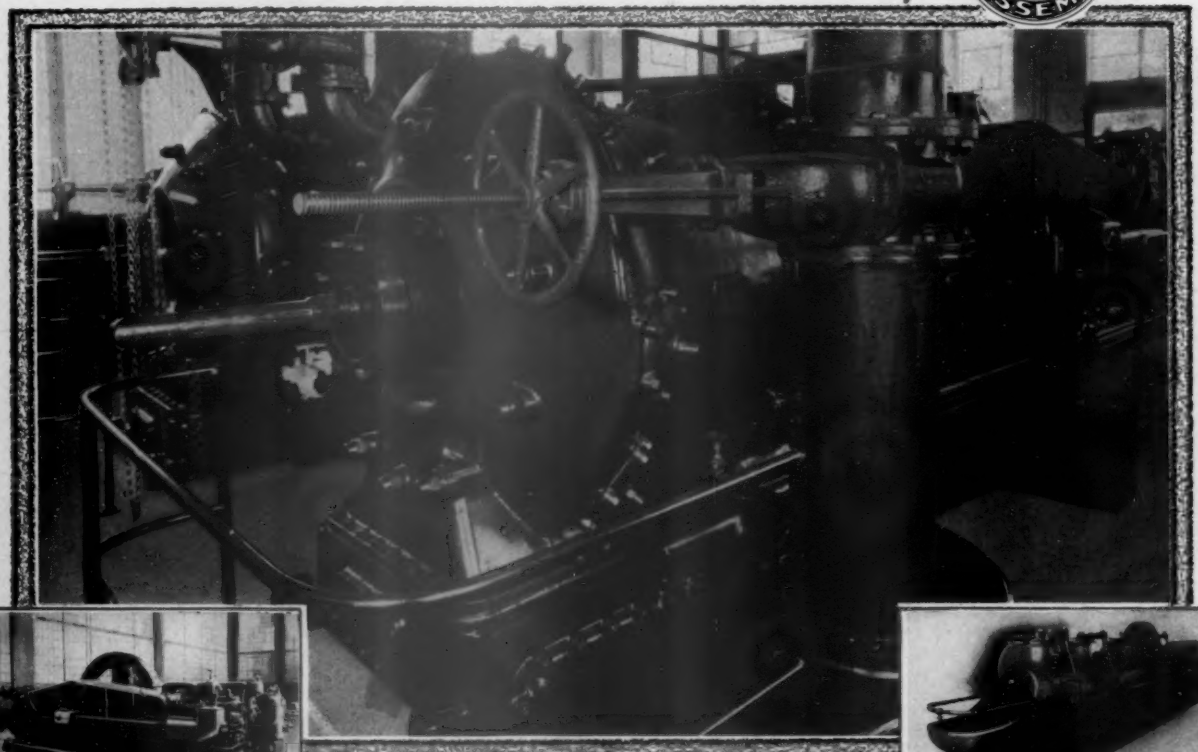
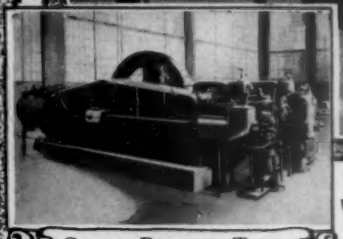
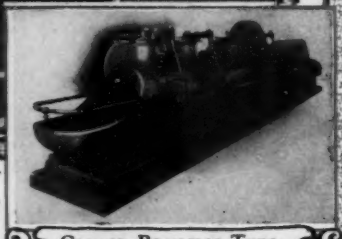
USE GAS
TO COMPRESS GAS!





Cooper-Bessemer Type-80 is built as a single cylinder — 85 B. H. P., or as a twin cylinder — 170 B. H. P. unit for compressor and booster service.

WHERE THE LOAD FACTOR IS LOW
WHERE THE PEAK LOAD IS HIGH



Cooper-Bessemer Type-19 is built in standard sizes from 200 to 760 B. H. P. in four combinations of cylinders for compressor service.

It is sound business to utilize your own product — when, by doing so, you save money and get sure results.

Cooper-Bessemer Gas Engine driven Compressors operate on manufactured gas. Used in the main plant as a stand-by unit to the electric motors, a Cooper-Bessemer eliminates the investment and maintenance of a steam plant. Used away from the main plant for high pressure transmission with low load factor, the over-all cost of its use is less than for either steam or electricity. Accessibility, reliability and low-cost operation are the points that will appeal to you. Write for details.

THE COOPER-BESSEMER CORPORATION

Formerly The C. & G. Cooper Company and The Bessemer Gas Engine Company

Mount Vernon, Ohio — Grove City, Pa.

Branch offices in all principal cities

We've an Oft-Repeated Point to Make About This Brand-New Gas Holder

The scene is Dallastown, Pa. . . . The capacity is 50,000 cu. ft. . . . The working pressure is 50 pounds . . . But far more important is the fact that here is a new result of Cruse-Kemper's careful work from first design to finished job. The Holder is calked every inch of the way, as all Cruse-Kemper Holders are, and we know we'll be proud of its service record year after year.

CRUSE-KEMPER CO.

AMBLER, PA.

This is something we'd be pleased to send you.

It's a little monthly review of news for executives.

6 Manometers in One

Brown Model 253 High Pressure Manometer—with 6 easily changed range tubes.

To change the range of a Brown Electric Flow Meter is as easy as replacing a chart.

Just change the range tube—the same manometer is used—the same orifice. No shutdowns—no expensive new equipment—no trouble.

Investigate this exceptional Flow Meter. It has many features of special value.

Write today for complete details.

THE BROWN INSTRUMENT COMPANY
4473 Wayne Ave., Philadelphia, Pa.
Branches in 20 principal cities
"To measure is to economize"

Brown Electric Flow Meter

on the Inductance Bridge Principle

" 'Economizing' Again, Eh?"

"—I know it's a temptation, to substitute perishable pipe in small sizes. But where's the saving when it begins to rust?

"Cast iron pipe won't rust. And we can get it McWane-made now, cast in sizes as small as 1¼ and 2 inches, and with factory-made joints if desired that hold gas at high pressures.

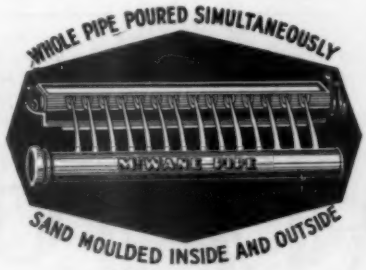
"So let's practice real economy—get a pipe that we won't have to coat and coddle; that will never rust out; and with joints that hold gas under expansion and contraction, and other difficult conditions."

McWane cast iron gas pipe comes in sizes 1¼ through 12 inches. Distinguished for resiliency and high tensile strength—29,000 lbs. average. Transverse strength —2,600 lbs. Modern in weight and strengths, yet sandcast in the good old way to make a pipe unequalled for cutting and tapping. At least find out.

B & S, Flexpan, McWane threaded, or plain ends—"A joint for every pressure."

McWANE CAST IRON PIPE CO. BIRMINGHAM ALABAMA

123 So. Broad St., Philadelphia
1807 Santa Fe Bldg., Dallas
208 S. La Salle St., Chicago



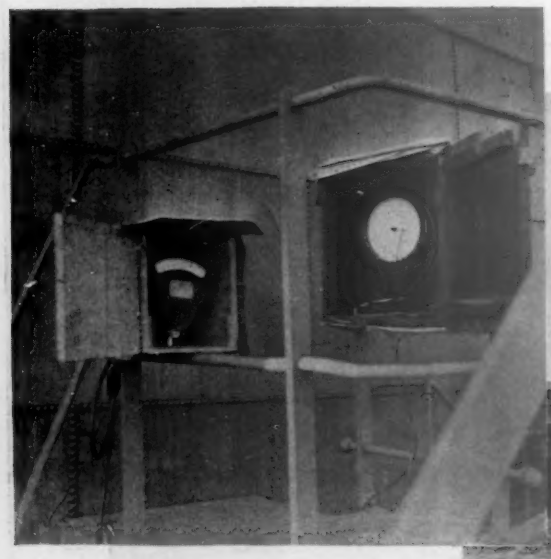
111 Sutter St., San Francisco
226 Continental Oil Bldg., Denver

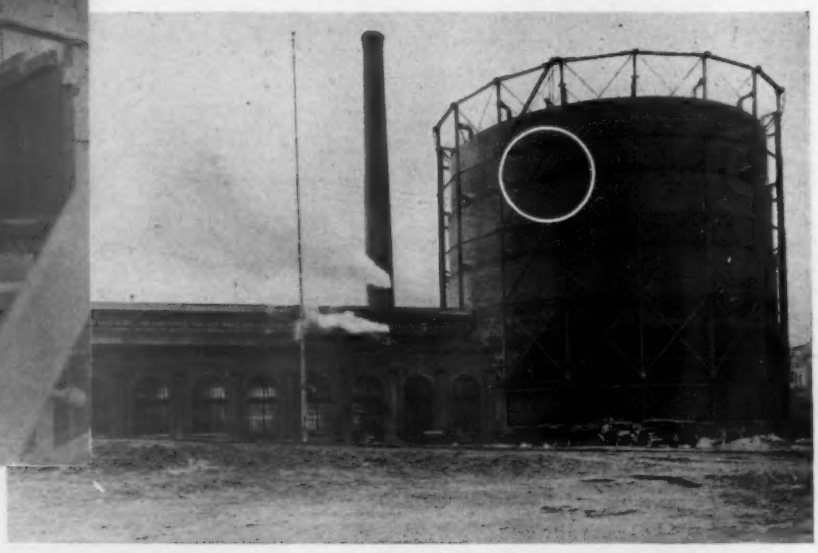
PACIFIC STATES CAST IRON PIPE CO. PROVO, UTAH

417 S. Hill St., Los Angeles
611 Spalding Bldg., Portland, Ore.
149 W. 2nd South St., Salt Lake City

Automatic Control of

Seal Water Temperatures





At right: Three million cu. ft. holder on which Bristol's Control Equipment is installed. Above: Close-up showing details of mounting Recording Thermometer and Thermostat Controller.

Effects SAVING Of $972.18

In FOUR MONTHS

SOME years ago a group of Gas Engineers were discussing the comparative cost of manual vs. automatic control as applied to seal water temperatures on a 3,000,000 cu. ft. holder. No definite figures seemed to be available . . . so one man decided to run a test of his own. He remembered having an old steam flow meter at the plant. This he installed on the steam line to holder. Telling his men to operate as usual and disregard the meter, he kept a close check on steam consumption during the winter season of 1928-1929.

Before the next season of 1929-1930, Bristol's Low Temperature Control Equipment was installed as shown in the illustrations at top of page. This equipment consisted of a Thermostat Controller, Motor Operated Controller Valve and Recording Thermometer, The Motor Operated Valve is not shown here, but was installed inside the plant on the main steam feeder line to holder. The Controller and Motor Valve operated together to automatically turn on and shut off the steam flow as was demanded by changes in seal water temperature, the recording thermometer providing a continuous chart record of actual temperature maintained.

Due to the interest shown in this experiment, very careful records were kept — records which we were very kindly granted permission to reproduce. The net saving shown on the record sheet should prove very interesting . . . a saving, by the way, *which more than paid for the entire control equipment three times over.*

So successful was this initial control job, that the New Jersey Company immediately ordered similar control units for installing on their remaining holders.

For complete information, prices, etc., write direct to the Bristol Company, Waterbury, Conn., or to nearest Bristol Branch Office. Field Engineering Service without obligation.

COST OF HEATING 3 MILLION CU. FT. HOLDER

	Cost Per Month	High Atmos. Temp.	Low Atmos. Temp.	Avg. Atmos. Temp.	Avg. Cost. Steam per Day
December 1929	$803.44	55	10	35.1	$26.78
January 1930	835.09	57	10	31.8	27.63
February 1930	520.73	73	4	36.0	17.36
March 1930	268.33	63	18	39.9	11.18
1929-1930 Total Cost	$2,427.59	Steam turned off Holder March 24, 1930.			
1928-1929 Total Cost	$3,399.77	Bristol Thermometer Control used during winter 1929-1930.			
Difference	$ 972.18				

C - 250
203
175

RJJ:DR
5/13/30-

BRANCH OFFICES: Boston, New York, Philadelphia, Pittsburgh, Birmingham, Akron

BRISTOL'S SINCE 1889

Instruments *for* Indicating Recording Controlling

BRANCH OFFICES: Denver, Chicago, Los Angeles, Detroit, St. Louis, San Francisco

LINDE PROCESS SERVICE Speeds Pipe Line Welding

. . . . . and offers invaluable assistance in organizing your welding operations for maximum speed and economy.

Step by step, from the mobilization, training, and testing of welders and the careful selection of equipment and supplies, it goes to the final testing of the line. Cooperating with your own engineers, it makes available to users of Linde Oxygen the facilities developed by years of experience on thousands of miles of pipe line.

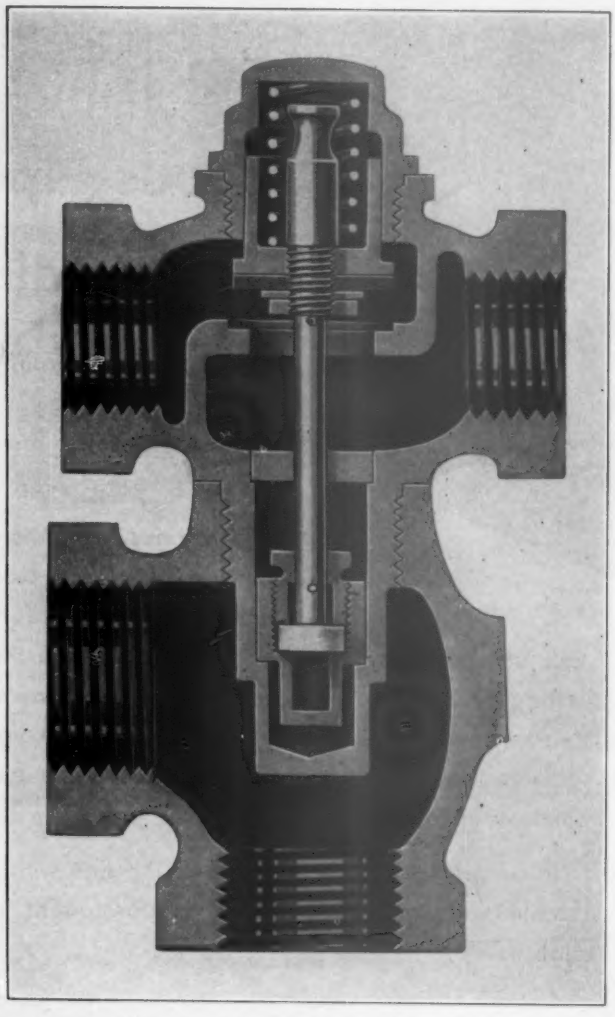
It assures absolute tightness of the line with tough, ductile welds as strong and as permanent as the pipe itself.

THE LINDE AIR PRODUCTS COMPANY, THE PREST-O-LITE COMPANY, INC., OXWELD ACETYLENE COMPANY, UNION CARBIDE SALES COMPANY,
Units of UNION CARBIDE AND CARBON CORPORATION

General Offices . . . . . New York UCC Sales Offices . . . in the Principal Cities

65 Linde plants . . . 48 Prest-O-Lite plants . . . 174 Oxygen Warehouse stocks . . . 156 Acetylene Warehouse stocks
42 Apparatus Warehouse stocks . . . 245 Union Carbide Warehouse stocks

Here's the Valve—
that "Positively Prevents" Boiler Explosions
(In Gas Water Heaters)
(The Lovekin Emergency Gas Shut-off Valve)



The possibility of damage to property and at times to human lives is entirely eliminated,—the moment a Lovekin Emergency Gas Shut-off Valve is installed on the Gas Water Heater. This valve is placed on the cold water inlet close to the boiler and functions by the EXPANSION of the hot water within the boiler and the CONDUCTION of heat to the Fusible Metal Disc. *IT WILL BE NOTED THAT THE "FUSIBLE DISC" IS NOT IN CONTACT WITH THE WATER,* and that it is a very simple matter to remove the Fusible Disc and insert a new one, after the valve has done its work

Special attention is called to the compactness, accuracy, neatness and accessibility of this valve. It is the very "last word" in the Emergency Gas Shut-off Devices,—*AND THERE IS NO OTHER VALVE LIKE IT ON THE MARKET TODAY.*

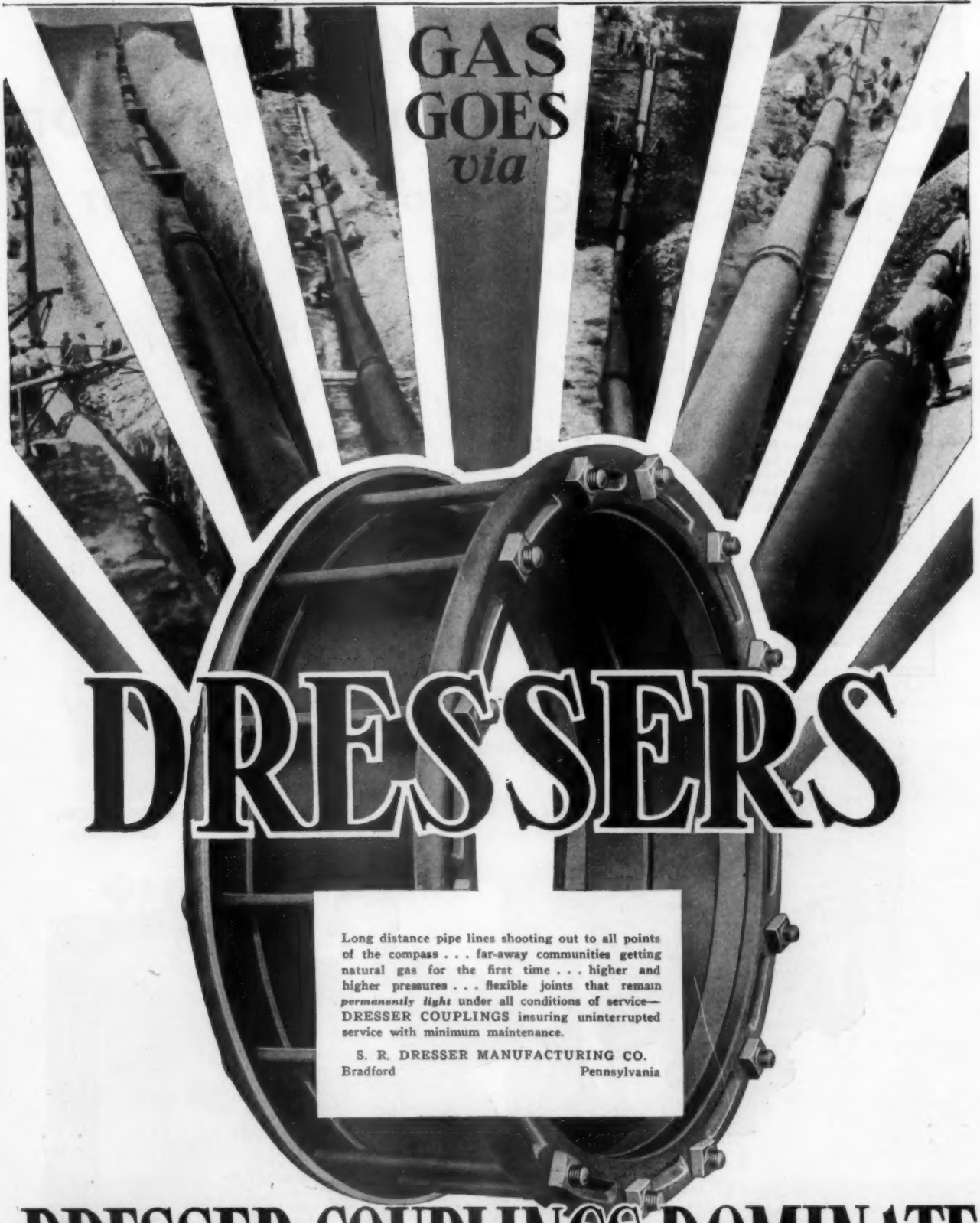
Also,—it is well to note, that the LOVEKIN VALVE is the successful result of many years painstaking research and experimentation.

Literature and full details on these valves will be sent upon request

KITSON COMPANY

261 North Broad Street
Philadelphia Penna.

EAST — WEST — NORTH — SOUTH



DRESSERS

Long distance pipe lines shooting out to all points of the compass . . . far-away communities getting natural gas for the first time . . . higher and higher pressures . . . flexible joints that remain *permanently tight* under all conditions of service—DRESSER COUPLINGS insuring uninterrupted service with minimum maintenance.

S. R. DRESSER MANUFACTURING CO.
Bradford Pennsylvania

DRESSER COUPLINGS DOMINATE

Reynolds Low Pressure Service and Appliance Regulators

Designed and Built for »

1. ACCURACY
2. EFFICIENCY
3. DURABILITY

» Install REYNOLDS Units and do away with your Gas Control worries. They have the usual Reynolds characteristics—operating simplicity—absolute dependability. These Low Pressure Regulators operating on an inlet pressure of one pound or less will work from one-half inch to six inches outlet pressure.

REYNOLDS PRODUCTS

for all kinds of Pressure Reductions » » for either artificial or natural gas.

GOVERNORS » »
- Intermediate Pressure
- Triplet Outlet
- Holder
- Toggle Type Street

REGULATORS » »
- High Pressure Service
- Low Pressure Sevice
- Intermediate Pressure
- High Pressure Line
- Single and Double District Station

VALVE » »
- Automatic Quick-Closing Anti-Vacuum

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Reynolds Branch Office, Room 422 Dwight Bldg., Kansas City, Mo.

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GAS CONTROL SINCE 1892

"For every joint on every line"

A FEW LEAKING JOINTS CAN CANCEL CONSTRUCTION ECONOMIES ON ANY PIPE LINE JOB.

For low cost installation — no leaks — no joint maintenance cost — SPECIFY VICTAULIC COUPLINGS

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Mail the Coupon for Victaulic Bulletin

Available in every size from ¾ inch up—for steel, wrought iron, cast iron and spiral weld pipe—any pressure. See Sweet's page 451. Mail the coupon below.

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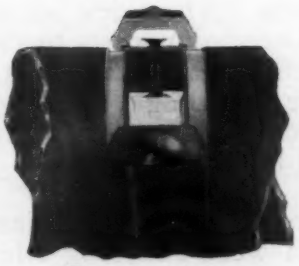

"For every joint on every line"

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FOR OIL, GAS, WATER, SEWAGE, COMPRESSED AIR, ETC.

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For uses, installations, specifications and prices, fill in and mail this coupon.

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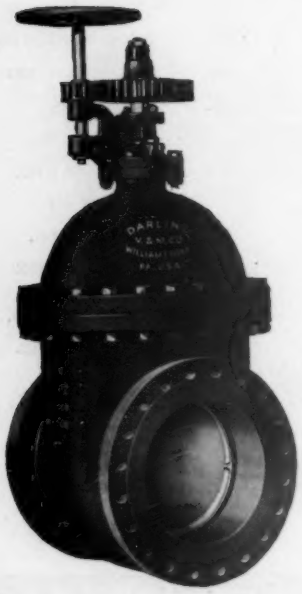
There can be no ECONOMY

—Beaconsfield

Economy—

2. Management of the affairs of a community—directly concerned with its maintenance or productiveness.

—as defined by Webster



DARLING
GATE VALVES

"THERE can be no ECONOMY where there is no efficiency."

All too often, purchases based on price are merely false economy. Though Darling Valves may cost a few cents more, their *prolonged efficiency* quickly puts them in the class of sound economy.

Darling Valves are sturdily constructed on sound mechanical principles—with revolving gate discs that seat in a new position at each closing. This exclusive feature insures a perfect seal and prevents scoring and wearing of ridges on discs and seat faces. There are no ribs, guides, shoulders, corners or pockets to catch scale or sediment which might interfere with the operation of the valve. Darling Valves are so easy in action that even the largest ones can be conveniently operated by one man.

There are other important features that insure the perfect seal, even wear and long life of Darling Gate Valves. Full particulars gladly furnished on request.

Darling Valve & Mfg. Co.

Williamsport, Pa.

New York Oklahoma City Houston Los Angeles

780

To Men Who Figure Costs With Sharp Pencils

Paring down costs of gas plant maintenance materials is admittedly an increasingly difficult task. Some savings are rated in tiny figures but every decimal counts. Others—

But why search for infinitesimal savings when big ones are right at hand. Your refractory cements, if chosen carefully will open up a striking opportunity to produce unusual economies in every phase of operation where refractory cements are used.

In one plant gas machines have been run over 4500 hours without relaying brick. In this same plant and others there have been corresponding savings at many other points of operation. Why not investigate R & E Cements for your plant—we'll gladly tell you all about them, no obligation of course.

Coke oven operators throughout the country are making many favorable comments about our "Refractory Data Sheets for Coke Oven Plants." Why not know the facts about R & E Cements for your gas plant—send for your copy of these data sheets.

REFRACTORY & ENGINEERING CORPORATION

Engineering & Manufacturing Specialists in High Temperature Cements

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SPRAGUE METERS
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House Heating Jobs

Accurate Pilot Measurement
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Satisfactory
Maintenance cost, first cost, and general results in Manufactured or Natural Gases, High or Low Pressure

THE BIG RUSH is on!
We can take care of you promptly

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LOWER PRICES « «

G - 4
PHILFUEL

DURING the past year the Gas Industry has been actively engaged in broadening its markets through an intensive construction program of Butane-air plants.

To handle this large increased volume of sales, Philfuels Company has expanded its production and transportation facilities for liquefied petroleum gases.

Resulting economies are being passed on to the Gas Industry through new contract price schedules for commercial Butane and Propane which reduce raw material costs more than 30%.

These lower prices bring increased earnings to some 35 existing Philfuels Process plants and represent Philfuels' contribution to more profitable situations for the Industry, and to increasing the availability of gas service to the public.

We will gladly send full information on request.

Gas Manufacturing Division

« PHILFUELS COMPANY »

(Subsidiary of Phillips Petroleum Company)

7-101 GENERAL MOTORS BLDG. - DETROIT, MICHIGAN

« « ON BUTANE

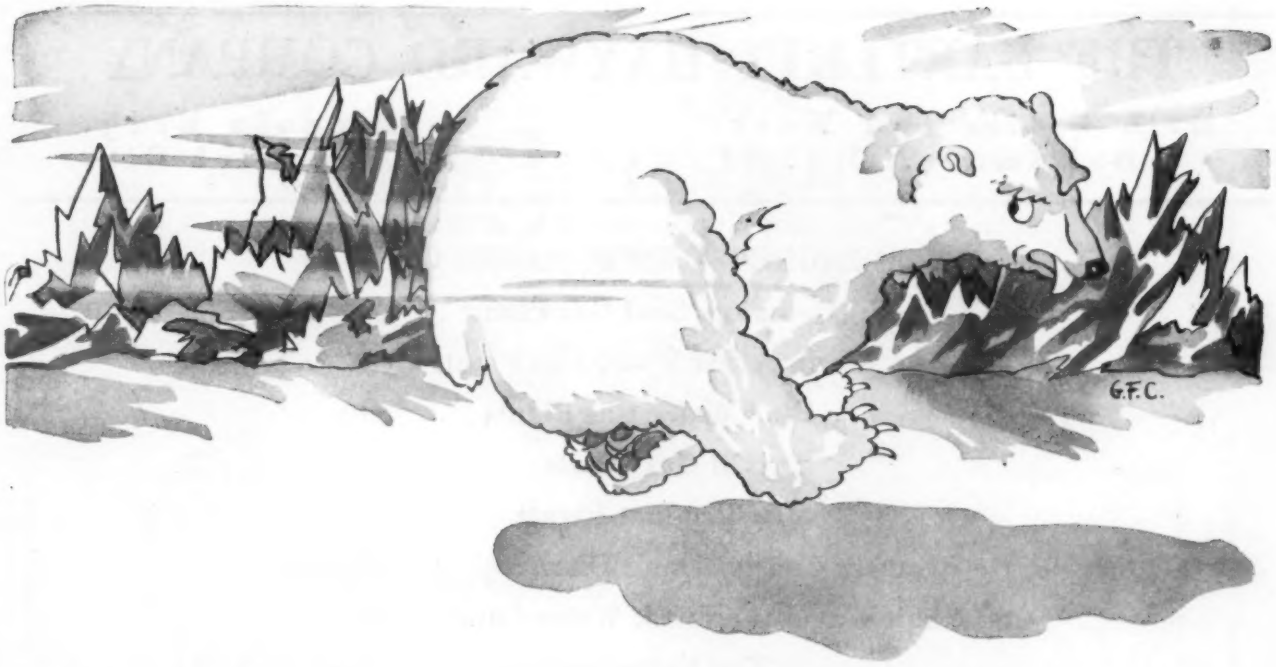
Polar bears

neither do CAST IRON MAINS need artificial coatings

MAINS of cast iron don't need costly coatings to protect them from rust and corrosion. For cast iron metal itself possesses inherent rust-resistant qualities which protect it far more surely than any man-made coating.

When oxidation attacks a cast iron pipe, the particles of iron in the surfaces of the metal undergo a chemical change but remain securely in place. Thus they form a *natural* coating to the metal underneath. Indeed, cast iron is the one ferrous metal practicable for underground mains that will *not* disintegrate from rust.

Convincing evidence of cast iron pipe's superior durability is shown by its service records in America's leading cities. Today, original cast iron mains, *which were laid many years before coatings were invented,* are still serving faithfully.



don't need overcoats,

This uncoated cast iron pipe originally laid in the city of Boston in 1886 was recently relaid in high pressure system.

It is accepted practice among engineers and city officials to rate the useful life of cast iron pipe at one hundred years. Instances are known of even longer life — two centuries and more. This unequalled durability means an actual saving of millions of dollars by eliminating the costly business of replacing short-lived mains.

The Cast Iron Pipe Research Association offers detailed information regarding the advantages of specifying cast iron pipe for water, gas, road culverts or for industrial uses. Address The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Illinois.

Cast iron pipe bearing the "Q-Check" trade mark is obtainable from the following leading pipe founders: Alabama Pipe Company, Anniston, Ala.; American Cast Iron Pipe Company, Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Avenue, Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Company, Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham Ala.; United States Pipe and Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Company, 11 Broadway, New York.

Look for the "Q-check" symbol stenciled as shown above. It is the registered trade mark of the Cast Iron Pipe Research Association

CAST IRON PIPE

THE BARTLETT HAYWARD COMPANY

Main Office and Works
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DESIGNERS AND BUILDERS OF

Complete Coal Gas Plants

Carburetted Water Gas Plants

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B. H. Co. Vertical Centrifugal Scrubbers
(Feld Type)

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(Genter Type)

Steel Tanks

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B. H. Co. Westling Valve
(Patent Applied For)

Fast's Flexible Couplings

GAS HOLDERS

THE BARTLETT HAYWARD COMPANY'S MAIN PLANT

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900.

HENRY M. RILEY, *Editor*

More than a Coincidence

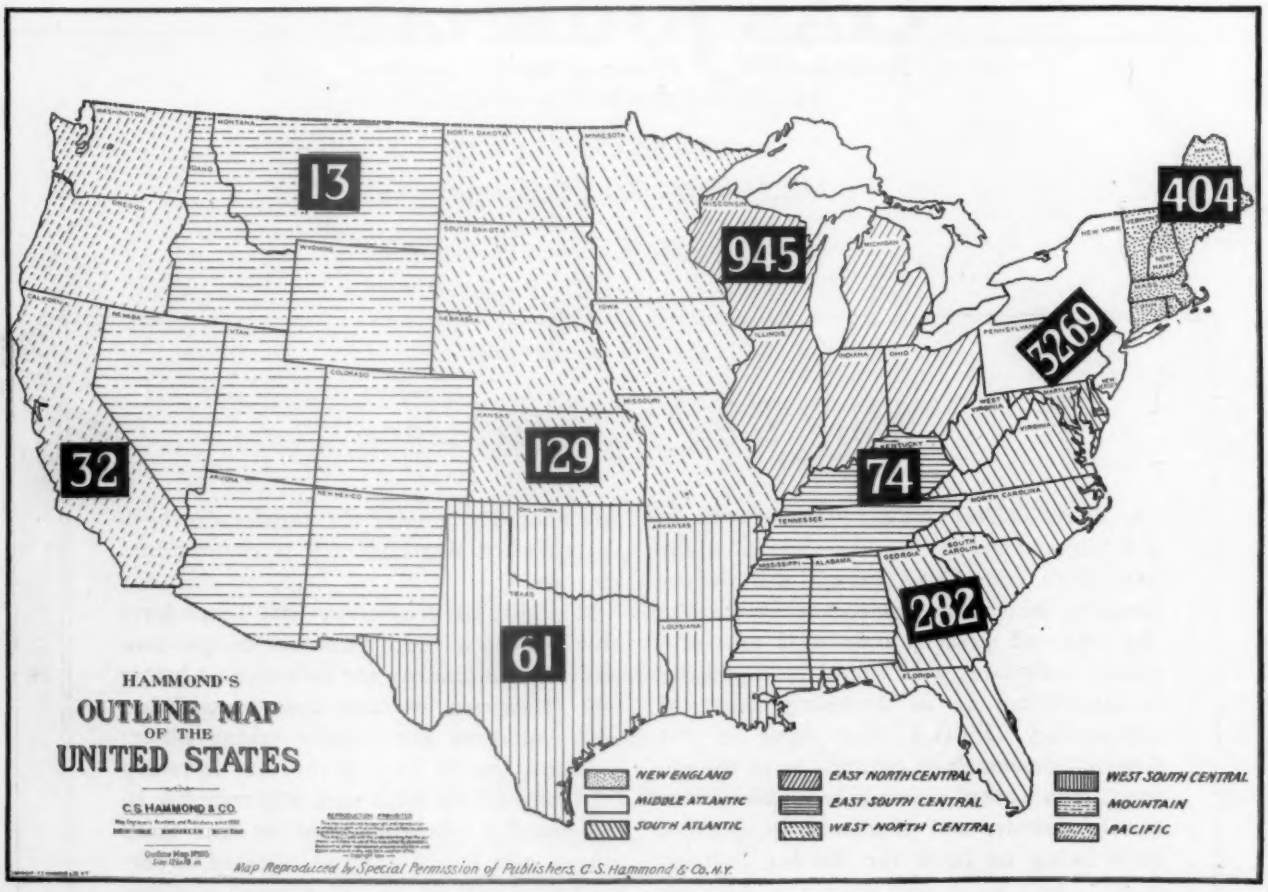
AN ATTENDANCE such as graced the recent A. G. A. Convention would have been considered exceptional during times of normal business, but, viewed, in the light of present industrial and economic conditions, one would be niggardly in describing it as anything short of astounding. Indeed, this phase of the Convention somehow reminds us of the old grads who walked, hitch-hiked, pawned the family jewels, and similarly guaranteed their being on hand for the big football game. And so it was with the Atlantic City meeting, although the aforesaid transportation expedients were not resorted to —unless one might make a shift to translate them in terms of many of the delegates exercising a bit of super-salesmanship on their "bosses." Incidentally, those who gave their superiors some good reasons as to why they should be on hand deserve considerably more than a pat on the back by way of commendation.

So there is the picture. At the start, a drab background consisting of preliminary rumors that the attendance would be rather slim, lack of the proper setting due to business conditions but, in the end, the touch of inspiration that sent some *seven thousand* gas men to Atlantic City to find out how to do a better job. The large attendance was more than a coincidence and should engender the comforting feeling that the Gas Industry is coming into its own.

It might be contended that there have always been a goodly number of gas men interested in finding out how to do a better job. However, we now face a condition where changes are rapidly taking place; indeed, it might be said that our industry is in travail and those who will minister to the healthy offspring must be fit. Such fitness will entail a knowledge of order-producing selling. It will demand accurate information on the engineering aspects and economics involved in bringing natural gas into a manufactured gas community and the subsequent decision as to whether straight natural or a mixed gas is to be served its customers. It will require more than a passing study of the ultimate disposition of propane and similar fuels. It will exact accurate procedure in laying and protecting mains. It will call for careful study of rate making, accounting and other activities incident to the gas business.

Clearly, these requirements were never so pressing in previous years and, we believe, constitute the factors which influenced such a large attendance. And none can gainsay that the pilgrimage was well worth while.

Where They Came From



THE above map shows the number of people from various geographic sections of the country in attendance at the 1930 Convention of American Gas Association at Atlantic City, New Jersey. In addition to these figures, which cover the official registration up to ten o'clock in the evening of the third day only, there were also present about twenty gas men from Canada as well as guests from England and far-off Japan.

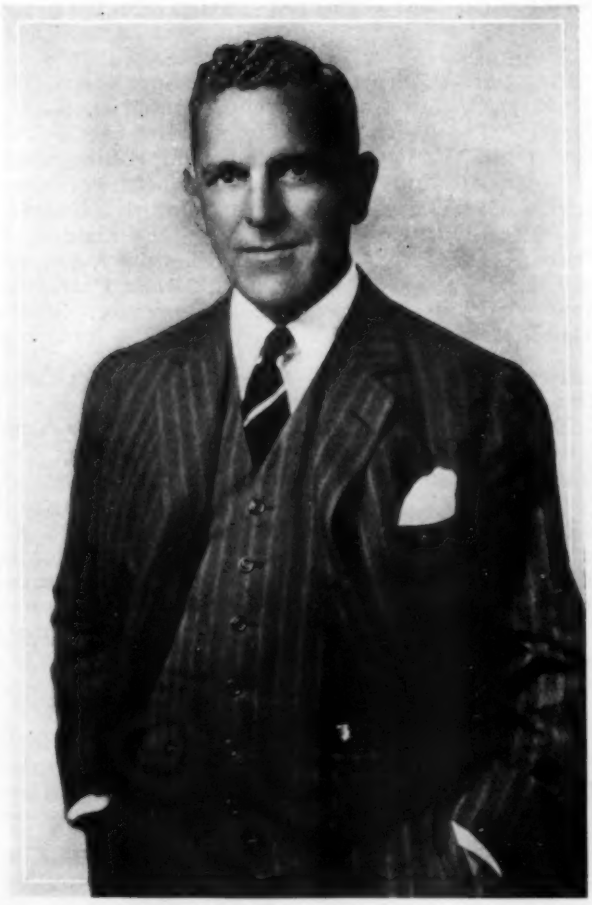
From the New England states Massachusetts sent the largest number, 251; the other leading states tallied the following: Middle Atlantic,—New York, with 1279; South Atlantic,—Maryland, 122; East North Central,—Illinois, 336; East South Central,—Tennessee, 30; West North Central,—Missouri, 67; West South Central,—Texas, 37; Mountain,—Colorado, 12; Pacific,—California, 30.

Of the entire country 40 states were represented, as well as the District of Columbia.

The average gas man in attendance came a distance of approximately 315 miles, as the airplane flies, in order to be on hand, spent about three days at the convention, with a total outlay in money of perhaps $90, and undoubtedly took back home enough new ideas and information to have well warranted the journey and expense.

A Significant Gathering

Twelfth Annual Convention of American Gas Association Shows Gas Industry Entering Era of Enormous Expansion and Progress



Clifford E. Paige, President-elect, American Gas Association

REGARDLESS of the success attained by future meetings of gas men the 1930 convention will long be regarded as one of the most significant ever held by the Gas Industry. From the standpoint of attendance, quality and number of exhibits, and the calibre of papers and reports presented at the various sectional sessions the meeting left nothing to be desired.

The attendance speaks for itself and it was stimulating to note that among the 7000 present a goodly number of the leaders in natural gas affairs were included. It is difficult to estimate the far-reaching good that will accrue to the Gas Industry by reason of this relatively vast number of gas men having met and interchanged ideas as to how the Industry's affairs can best be administered.

These seven thousand gas men came prepared to discuss the Industry's problems, to find out ways and means for their correct solution and to give freely of their own experience and ideas in this connection. It is reasonably certain that each of these men took back to his particular organization at least one good, workable idea; hence, the ultimate benefits wrought by the meeting can be said to be of the order of seven thousand multiplied many times over.

Touching upon the matter of exhibits it is well to first bear in mind that the outlay in money, as represented by the manufacturers' time, value of the appliances and equipment displayed, transportation and other items incidental to the staging of such a show, ran somewhat above three quarters of a million dollars. Such an evidence of faith in the Industry they serve was amply reciprocated by the attention and consideration accorded the exhibits by the visiting gas men. It was no uncommon sight at this meeting to see many of the Gas Industry's outstanding figures whole-heartedly inspecting the various appliances and equipment, thus setting a fine example for their employees. The index of a gas convention's success is largely measured by the quality and extent of the manufacturers' exhibit. Accordingly, the 1930 Convention was more than a decided success.

The addresses and papers presented throughout the entire meeting formed a truly impressive array. The General Sessions were addressed by a number of outstanding gas men as well as several nationally known economists and engineers whose daily work brings them into intimate contact with gas affairs. In the various sectional meetings the attendance frequently taxed the meeting room accommodations and the subjects handled bespoke a keen appreciation and grasp of the Industry's needs. Few if any papers escaped the drum-fire of intelligent discussion and criticism.

The social aspect of the convention was also of a record-breaking nature. For the "light-footed" gentry dancing and music aplenty were furnished, while on the evening of the third day a musical program of splendid quality was rendered. During this latter feature much of the vocal and instrumental music as well as a fine address by President Mullaney were broadcast over a coast-to-coast network through the courtesy of Halsey Stuart and Company and the National Broadcasting Company.

Especial commendation is due the officers and general staff of American Gas Association for staging the best convention held to date by the Gas Industry.

Newly Elected Officers and Directors for 1930-31

President—Clifford E. Paige, vice-president, The Brooklyn Union Gas Company, Brooklyn, N. Y.; Vice-President, R. W. Gallagher, President, The East Ohio Gas Company, Cleveland, Ohio; Vice-President, Arthur Hewitt, General Manager, Consumers Gas Company, Toronto, Ontario, Canada; Vice-President, N. C. McGowen, Vice-President & General Manager, Louisiana Gas Company, Shreveport, La.; Treasurer, William J. Welsh, President, New York & Richmond Gas Company, Staten Island, New York.

Directors for 2-Year Term—Walter C. Beckjord, The Boston Consolidated Gas Co., Boston, Mass.; J. D. Creveling, H. L. Doherty & Co., New York City; Raymond Cross, The Ohio Fuel Gas Co., Columbus, Ohio; Henry L. Doherty, Cities Service Co., New York, N. Y.; Oscar H. Fogg, The Consolidated Gas Co. of New York, New York, N. Y.; Samuel Insull, Jr., Midland United Co., Chicago, Ill.; F. A. Lemke, Humphrey Company, Kalamazoo, Michigan; A. E. Peirce, Central Public Service Corp., Chicago, Ill., and Arthur Stockstrom, American Stove Co., St. Louis, Mo.

Departmental and Sectional Officers

Natural Gas—Chairman—H. C. Cooper, Hope Natural Gas Co., Pittsburgh, Pa.; Vice-chairman, H. L. Montgomery, Cities Service Gas Co., Bartlesville, Okla.

Accounting Section—Chairman, John I. Blanchfield, Brooklyn Union Gas Co., Brooklyn, N. Y.; Vice-chairman, Wm. A. Doering, Boston Consolidated Gas Co., Boston, Mass.

Commercial Section—Chairman, E. R. Acker, Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y.; Vice-chairman, Samuel Insull, Jr., Midland United Co., Chicago, Ill.

Industrial Gas Section—Chairman, D. W. Chapman, Peoples Gas Light & Coke Co., Chicago, Ill.; Vice-chairman, A. J. Peters, Consolidated Gas Co. of N. Y., New York, N. Y.

Manufacturers Section—Chairman, E. S. Dickey, Maryland Meter Works, Baltimore, Md.; Vice-chairman, David B. Kahn, Estate Stove Company, Hamilton, Ohio.

Publicity and Advertising Section—Chairman, Donald M. Mackie, Commonwealth & Southern Corporation, Jackson, Mich.; Vice-chairman, William H. Hodge, H. M. Byllesby Co., Chicago, Ill.

Technical Section—Chairman, R. G. Griswold, Cities Service Co., New York, N. Y.; Vice-chairman, I. K. Peck, Midland United Company, Chicago, Ill.

In addition to the above Sectional Officers, Miss Karen Fladoes, Equitable Gas Company, Pittsburgh, Pa., was appointed Chairman of the Home Service Committee.

Incidentally, the election of the foregoing individuals guarantees the efficient operation of Association affairs.

General Sessions

The Gas Industry's Leaders and Nationally Known Figures Discuss Trends in Gas Matters

THE General Sessions produced an excellent estimate of the present status of the Gas Industry and reflected an optimistic outlook as far as the future is concerned.

President Bernard J. Mullaney delivered his usual exhaustive but compact estimate of the progress being made in gas matters. He also touched upon the present business situation and voiced an optimistic opinion of the country's ability to get back to normalcy in a reasonably short period. He cautioned against comparing business conditions with the year 1929, since this was a boom year. Touching upon the matter of the stock market he said: "It will be a better day when quotations stay put in the back pages of the newspapers and the stock-market-minded multitude goes back to work." In line with the business situation he showed that "the gas industry has suffered less in this period than almost any other." This condition he said, "is largely of our own making, not an off-shoot or by-product of favorable circumstances around us."

President Mullaney had some good advice to give relative to radicalism and the subsequent governmental encroachment in all branches of business. "Government ownership proposals, for example: whether federal, state or municipal; whether in the field of transportation, of public utility service, of fertilizer production, of insurance or some other—every last one of them is as definitely socialistic *in its ultimate purpose* as a Russian soviet decree abolishing all private property at one stroke. It is fatuous self delusion to think otherwise," he said.

With reference to natural gas President Mullaney made the following observations:

"Natural gas—the spectacular growth in its production and long-distance transmission—engages the interest and attention of the entire country. It is probably the most important business development of the past three years in all American Industry, for it points to significant changes in a large part of the country's economic, industrial and domestic life.

"No one can predict how far this development may extend, but, assuming that our geological knowledge is reasonably accurate, it is conceivable that a degree of stability may be reached within a year or two upon which an approximation of the future may be based. Meanwhile, many questions asked daily by economists,

Jesse Adams Harvey, winner of Meritorious Service Medal

For saving the lives of six men who had been overcome by gas, Jesse Adams Harvey, of Auburn, N. Y., a tinsmith, employed by the Empire Gas and Electric Company, was awarded the American Gas Association Meritorious Service Medal at its twelfth annual convention. The presentation was made by President B. J. Mullaney.

Each year this award, which was made possible by the generosity of Walter R. Addicks, senior vice-president of the Consolidated Gas Company of New York, N. Y., is conferred upon the individual who is adjudged to have performed the most meritorious act in the gas industry in a twelve-month period.

It was on April 16, 1929, that Mr. Harvey rescued a foreman and five laborers, who had been assigned the task of cleaning and repairing a gate valve in a twelve-inch gas main. This valve was located in a cellar. During their attempt to repair the valve, the removal of bolts caused the gas pressure to blow a blinding shower of rust particles in their faces. Temporarily blinded, the men quickly were overcome by the escaping gas when Mr. Harvey, who was engaged in another task, stumbled upon them. Acting quickly, he extinguished a nearby open flame test light and unmindful of the danger which was growing greater each moment, he started into the cellar and had dragged out four of the men before he became partially asphyxiated but managed to reach a telephone and called for help before collapsing.

His heroic act resulted in the saving of the lives of all the imperiled men.

by bankers, by our customers and by our own associates in the industry—questions of transmission expansion, of distribution, of gas mixture, and of ultimate rates—must go unanswered.

"At the moment, we are rapidly becoming largely a natural gas industry. Dealing with the effects of this calls for the highest degree of executive information and judgment. The best thought of our best men, real industrial statesmanship, is needed for the problems of assured supply and of financing, including the prevention or control of wildcatting in securities; it is needed for the problems of protecting the investors in existing gas enterprises, for the problems of price and rate adjustment, and for a multitude of other problems.

"Unless rates are right, a gas company's revenues may be impaired even to the point of disaster. Unless rates are right, the full usefulness of natural gas in its potential employments, both industrial and domestic, will be restricted. Unless rates are right, customer-dissatisfaction and public hostility of highly troublesome character, may be engendered.

"These problems concern the producers quite as much as they do the marketers of natural gas. What has been said about government-in-business also has some bearing here.

"Natural gas is, at this time, especially conspicuous among 'God's gifts to humanity,' as the radicals say it. Humanity cannot use the 'gift,' of course, until it is made available on the user's premises. But that does not stop effective play on the phrase by those who want to 'socialize' and governmentize industry. They have their eye on this business. The more intelligently we handle the business, the less they can do to hurt it. And, in the long run, stabilization of the business will be more profitable to all concerned than trying to squeeze the last possible nickel out of it at the earliest possible moment.

"We may well take pride in the fact that the American Gas Association has already recognized its share of responsibility, in so far as it can, for conserving this great natural resource. The Natural Gas Department is proceeding logically and sensibly, and with continuity of purpose, in co-operation with other agencies, to study and deal with the distressing waste of natural gas. In line with this effort, we are to have the pleasure this morning of hearing from a national authority on the subject of natural gas supply and development."

Due recognition of the splendid work being done by American Gas Association was given by President Mullaney, as well as the progressive spirit shown by the manufacturers of equipment and appliances. He also referred to the fine educational work that is being carried on to the end that the gas industry will be increasingly manned by better brain power. In addition, he spoke with optimism as to the eventual working out of the proper method of cooperating with outside agencies in the sale of more and better gas utilizing appliances.

Meritorious Service Medal donated by Walter R. Addicks

Forward's Address

Major Alexander Forward, Managing Director, reviewed the achievements and hopes of the gas industry in a tangible manner by way of facts and figures. In this connection he gave in part the following statistical information:

"During that year the revenues of the industry in the United States aggregated $924,000,000 an increase of nearly 5 percent over the preceding year. At the close of 1929 its customers numbered nearly sixteen and a half million, a gain of more than 500,000. To the service of these customers was dedicated an investment estimated at 5 billion dollars.

"The striking progress in natural gas developments is indicated by an

We of the gas industry have every right to be self-congratulatory on this relatively good situation. It is largely of our own making, not an off-shoot or by-product of favorable circumstances around us. It derives primarily from literal application of that formula given us at our first Association convention—hard work, careful management and thorough co-operation.—Bernard J. Mullaney.

increase of 22 per cent in the amount of natural gas produced and delivered to consumers during 1929. This unusual growth resulted in large part from the completion of many new distributing systems for cities and towns not previously served with gas.

"Of the total consumption of natural gas during the year, about 19 per cent represented domestic uses, the remaining 81 per cent being devoted to various industrial purposes. Domestic consumption of natural gas in 1929 aggregated 360 billion cubic feet, an increase of 12 per cent. At the close of the year the number of domestic customers totalled over 5 million, a gain of 18 per cent. Another significant feature of these data was an increase of 40 per cent in the quantity of natural gas consumed in the generation of electric power.

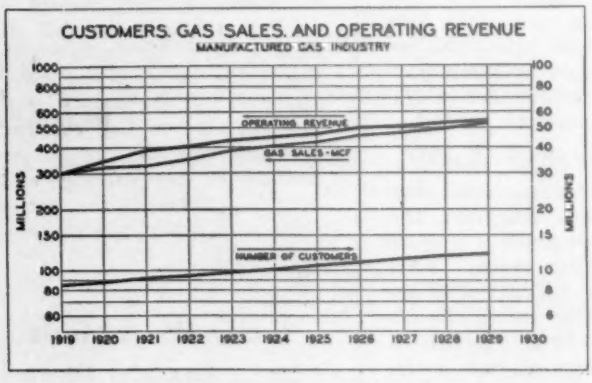


Chart by Paul Ryan, A. G. A. Statistician

"Despite the generally lower price levels of competing fuels prevailing throughout the year, sales of the manufactured gas industry aggregated 524,100,000,000 cubic feet in 1929, or an increase of nearly 6 percent over the preceding year. Sales of gas for house heating purposes registered the largest gain during the year with an increase of approximately 30 percent.

"Industrial-commercial sales also expanded materially, rising from 147,600,000,000 cubic feet in 1928 to 163,100,000,000 cubic feet in 1929, a gain of 10.5 percent.

"For the third successive year the production of water gas continued to decline, production in 1929 amounting to only 224 billion cubic feet, a decrease of 6.7 percent from the preceding year and a drop of more than 11 percent from the peak year 1927. On the other hand, there was an increase of more than 25 per cent in the quantity of byproduct coke oven gas produced in the plants of gas utilities.

"Coke oven gas purchased from merchant coke and steel companies increased nearly 22 percent during 1929.

"These changes in gas production are reflected in the fuel requirements of the industry. The amount of coke consumed by the industry itself declined for the second successive year, dropping from 4,188,000 tons in 1928 to 4,073,000 tons in 1929, a reduction of nearly 3 percent. Of the coke used by the industry, 2,470,000 tons were consumed as generator fuel for water gas manufacture and 1,603,000 tons were used as bench and boiler fuel. Another significant feature of these data is an increase of 13.4 percent in the amount of bituminous coal used as generator fuel in water gas manufacture.

"In 1929 the operating revenues of the industry increased by nearly 15 million dollars or 2.8 percent. Operating expenses, however, registered an actual decrease, dropping from $302,110,000 in 1928 to $299,872,000 in 1929. In the former year, operating expenses other than taxes absorbed 64 percent of operating revenues, whereas in 1929 this proportion had dropped to 62 percent.

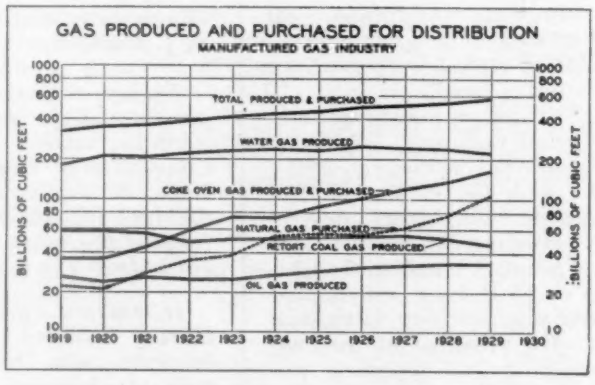

GAS PRODUCED AND PURCHASED FOR DISTRIBUTION
MANUFACTURED GAS INDUSTRY
TOTAL PRODUCED & PURCHASED
WATER GAS PRODUCED
COKE OVEN GAS PRODUCED & PURCHASED
NATURAL GAS PURCHASED
RETORT COAL GAS PRODUCED
OIL GAS PRODUCED
BILLIONS OF CUBIC FEET
BILLIONS OF CUBIC FEET
1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930

Chart by Paul Ryan, A. G. A. Statistician

"Taxes paid by manufactured gas companies have shown a continued and persistent increase during the past few years. In 1924 taxes constituted 8.7 percent of the operating revenues of the industry, whereas by 1929 this rate had risen to 9.7 percent.

"In spite of this increasing proportion of operating revenues absorbed by taxes, income from operations registered an increase of more than 12 million dollars, or nearly 9 percent during 1929. An especially significant feature of these data is a decline of 4.3 percent in fixed charges during 1929.

"While fixed charges decreased by $2,302,000, the income available for such charges increased $8,970,000, so that net income available for dividends and surplus increased by $11,272,000 or nearly 12 percent.

"During 1929 operating expenses per thousand cubic feet of gas sold were nearly 4 cents less than for the preceding year. While it would be difficult to ascertain what proportion of this was due to increased managerial

About three years ago, the transmission of natural gas a distance of more than 250 miles from its source was first accomplished, and this was really a noteworthy engineering feat. Today, this useful commodity is being transported twice that distance, and lines are being laid which will carry gas more than 900 miles from the points of occurrence. Let us not take such outstanding improvements too much as a matter of course; the industry should be congratulated on its long steps forward.—Scott Turner.

I affirm that the one keynote of all women's buying psychology is CHANGE! This explains why she is the heart and soul, the center of the merchandising world. Mrs. Consumer is more influenced by eye-appeal than men. It is, therefore, easier to get her attention—more difficult to hold it. On the contrary, men respond to action-appeals, and what a product does; women are constantly concerned with how it looks. This explains why Mrs. Consumer brought about such rapid changes in design, color, style and insistence on detail in countless lines of products.—Mrs. Christine Frederick.

efficiency and how much was the result of the generally lower prices for fuel and other materials which prevailed during the year, it is of interest to note that as a result of this lowering in the cost of production, the industry collected on the average of 3 cents less for every thousand cubic feet of gas sold to consumers than in 1928. At the same time there was available for stockholders dividends and surplus more than one cent additional for every thousand cubic feet of gas sold during the year.

"At the close of 1929 the manufactured gas industry in the Dominion of Canada served 530,000 customers, an increase of 6 percent during the year, while the investment dedicated to these patrons aggregated more than 65 million dollars. More than 18 billion cubic feet of gas were manufactured during 1929, representing an increase of nearly 15 percent over the preceding year.

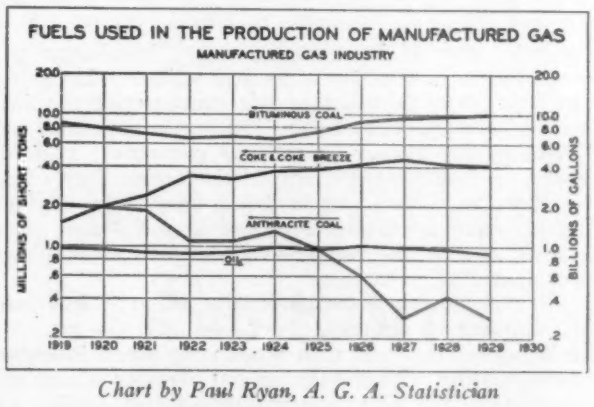

FUELS USED IN THE PRODUCTION OF MANUFACTURED GAS
MANUFACTURED GAS INDUSTRY
BITUMINOUS COAL
COKE & COKE BREEZE
ANTHRACITE COAL
OIL
MILLIONS OF SHORT TONS
BILLIONS OF GALLONS
1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930

Chart by Paul Ryan, A. G. A. Statistician

"The initial months of the current year 1930 witnessed a broadening of the Association's activities to include monthly statistical reports from our natural gas companies, and it is both a privilege and a pleasure to be able to attest to the splendid cooperation and assistance displayed by these companies in the inauguration of this service. Although started hardly more than 8 months ago, reports are now received regularly from companies representing more than 80 percent of the public utility distribution of natural gas.

"However, in considering the comparative data on the industry for the first eight months of 1930, it must be borne in mind that this period witnessed a recession in general industrial and economic activity fully as severe as any ever experienced by the trade and industry of this country. During this eight month period the production of bituminous coal declined more than 12 percent from the corresponding interval of 1929, the output of crude petroleum dropped 8 percent, pig iron production was down 20 per cent and steel ingot production 23 percent. During this same period the number of freight cars loaded dropped 11 percent while the production of automobiles declined by more than 36 percent.

"Despite this array of adverse influences however, the group of natural gas companies reported sales of nearly 340 billion cubic feet for the first eight months of 1930, a decline of only one half of one percent from the corresponding period of 1929. The revenues of these companies for the same period aggregated about 171 million dollars, compared with 172 million a year ago."

Testing Laboratory Progress

In "Five Years of Laboratory Progress" Mr. N. T. Sellmen, Secretary, Managing Committee, A. G. A. Testing Laboratory, told of how the laboratory has broadened its scope to include research work, this activity including mixed gas, utilization of higher hydrocarbon gases, liquefied gas products, industrial gas utilization, pipe joints, and others.

Relative to the laboratory's approval testing program Mr. Sellman had the following to say:

"While the expansion of our approval testing program has not been as great as that of our research activities, nevertheless there has been a very steady growth in the volume of this business. During the past fiscal year, 1,114 appliances were tested, of which 442 were finally approved. The first figure is 55 percent greater than for the preceding year and represents the greatest number of appliances tested during any one year. Undoubtedly, the most gratifying development in connection with this activity is the marked increase in the number of new patrons. Forty-five new concerns submitted appliances which is 16 per cent of the total number of the Laboratory's patrons at the close of last year. While gas appliance ordinances and sales resistance, encountered at times by manufacturers of unapproved types of appliances, have been factors in bringing about this increase, we believe it can truthfully be said that the prime motive inducing the majority of new concerns to submit their products for test, was a sincere desire on their part to improve them.

"Over 16,200 models of approved appliances are now available for our customers' use. The list includes gas ranges, water heaters, space heaters, boilers, furnaces. clothes dryers, incinerators, hot plates, and laundry stoves. In fact all of the commonly used domestic appliances are included. It is estimated that 75 per cent

The task is obvious. Your business and sales future is plainly charted . . . To educate your women customers in the new and scientific and steady preparation of foodstuffs in their homes—to make their cooking easier, more attractive! This is, perhaps, a direct appeal to your selfish interests—your sales volume of tomorrow—but I assure you that the home missionary work that you do, not only benefits the public utilities business but is a real public service—for I repeat, the well-fed nation is always the great nation. Such work on your part benefits you, benefits the public—and benefits the food manufacturers!—Clarence Francis.

of all the domestic appliances sold or offered for sale last year were of the approved types."

Natural Gas Conservation

In his paper, "Conservation of Natural Gas in Relation to Some Recent Developments," Mr. Scott Turner, Director, U. S. Bureau of Mines stated that:

"It is easier to indicate waste than to eliminate it. You know there is waste in the production and the consumption of natural gas, and that there may be *avoidable* waste in its production, distribution and usage. The extent and character of present waste should be ascertained, and some comparisons should then be made with previous conditions. It is well-known that your industry has not failed to consider this problem in the past, and it is a matter of common knowledge that the producers and distributors of natural gas have already made much progress in solving their individual problems. The present need, and I understand this is the opinion of your committee, is to find out what can be done by the industry as a whole, in securing the maximum of usefulness from the natural gas produced in the United States.

"The production and utilization of natural gas is so closely associated with the economic well-being of other major mineral industries, that the problem of natural-gas conservation cannot well be dealt with solely within the limits of this single industry. Before considering natural gas as a fuel, it must be thought of as a physical agent responsible to an important degree for moving crude petroleum to the surface. In this it performs a valuable service. Between 60 and 70 percent of the natural gas actually utilized is produced in conjunction with the out-put of crude petroleum, and the need for oil is thus an important factor in determining the quantity of gas brought to the surface. One of the main factors in determining the production-rate of natural gas is therefore under the control of the oil industry, which is associated with, but somewhat apart from, the natural-gas industry. The waste which occurs between the production of natural gas, and its utilization, results in part from this fact that one industry largely determines the rate and the amount of production, while another industry has the job of seeing to it that the produced gas is properly utilized.

"Because of the natural gasoline contained within it, there may be a demand for natural gas, entirely apart from its use as a propulsive agent in the production of crude petroleum, and aside from its fuel-utility. Natural-gasoline plants in various oil fields have assisted wells, and by making considerable volumes of residual gas available at central points. The carbon-black industry is interested in natural gas, and each one of us is personally interested in greater mileage from our automobile tires resulting from the use of carbon-black in tire-manufacture. Fuel-consumers are bound to be interested in this natural energy source, both as to the supply and in regard to future uses. The wide development of small power-units within the reach of gas-distributing systems will add to our millions of internal-combustion engines. It goes without saying that the producers of other industrial and domestic fuels, whether they be solid, liquid, or gaseous, should not be disregarded in any consideration of the conservation or utilization of natural gas."

Electric cooking gains because of determined and expensive sales and advertising effort. Up to recently, electric ranges were sold principally when gas mains did not exist, but now they are encroaching in gas-served territories. The competitive dangers are well set out in a recent range resolution adopted by the executive committee of the American Gas Association, at the request of the commercial section. The way to overcome this competition is ably set forth in the same resolution. It calls for a sustained program of superior sales promotion, including the expenditure of more money for advertising and the highest grade sales personnel. Modern sales methods, as a matter of course, include sensible and economical market research and analysis—William H. Hodge.

Aids to increased Sales

"The Gas Industry," said Vice-President Clifford E. Paige, in his paper, 'Sales Allies,' "on its own motion, never entered the appliance business. It was thrown into this business as a necessity for survival." Mr. Paige then went on to state that many of the older gas companies in the early days showed little interest in gas appliances. Further, he brought out that the first appliances were crude and inefficient. He showed that the development of the electric light started the gas men in the direction of becoming appliance conscious. Developing this idea Mr. Paige further said, "for a great many years appliances, particularly for domestic service, were built only with an eye toward efficient operation and with no consideration of their attractiveness, either in design or color, and with no regard for the strength, stability, or need for subsequent maintenance. The progress of the art in building gas appliances is in line with the development in taste of all housewives, with the result that today practically all gas appliances offered for sale add materially to the appearance of the surroundings in which they are placed."

He then proceeded to narrate how service has been bettered, how the Industry has kept abreast of the times by way of inaugurating sound installment payment plans, how advertising and publicity have been perfected, how the laboratory is guaranteeing the finest and safest appliances to the Industry's customers, etc. "Without the agency of the gas company," said Mr. Paige, "it is doubtful if any of the major lines of appliances would have come to be so universally used and indeed, in many cases, they would hardly have gotten a start against the tremendous competitive influences now operating."

He stated that gas companies are not at all interested in indulging in cut-throat business. To the contrary, he indicated that gas men were very much interested in cooperating with the dealer and plumber where such cooperation can be properly planned and carried out. In this connection he cited some of the good work that is being done along this line at the present time.

"In order that some definite accomplishment may come from these recent activities," said Mr. Paige, "it is suggested that a Committee from the Executive Board be appointed, who may draw upon the resources of the various sections of this Association, including the staff organization, to make a careful, impartial survey of the entire subject and report with recommendations to the Executive Board at as early a date as possible. It is sug-

gested further that the Managing Director of the Association be requested to advise people from whom he has had inquiry on this subject regarding the action taken.

"This is a matter of importance,—let us meet it fairly, frankly and fearlessly. Let us continue to uphold the doctrine which has been for so long a guiding principle:—The Utility will meet any proposition anywhere, anytime, a little better than half way."

For Better Public Service

Mr. George B. Cortelyou, President, Consolidated Gas Company of New York, told of the work that has been started in educating gas company employees in all departments to the end that all contact with the public will be mutually more pleasant and more profitable. His paper, "Serving Our Public," went on to outline and describe how such efforts are being harmonized and coordinated by way of the advisory body appointed by the A. G. A. Executive Board. This body, consisting of Past Presidents of the Association, is headed by Mr. Cortelyou.

"It was our belief at the time the Association was organized," said Mr. Cortelyou in conclusion, "that public relations is the business and the concern of everybody connected with the gas industry. That continues to be the opinion of this advisory group today, but that does not mean that it should be thought of as "anybody's business." Its various aspects should continue to receive consideration and study in all of the educational and committee work to which they are properly related, and the results of these combined and coordinated efforts will more firmly establish the industry in public recognition and good will, always assuming that we have first laid the essential foundation of satisfactory service at a satisfactory price, without which we have nothing upon which to erect a larger good-will structure."

The following were presented by the Committee on Resolutions.

RESOLVED that the American Gas Association reasserts its belief in the value of cooperative sales with merchants and craftsmen and approves the recommendation of the president-elect for a national survey of this subject.

RESOLVED that the Convention believes the Five Year Program of American Gas Association Activities, now in its fifth year, has resulted in coordination of thought, correlation of action, and makes highly important the working out by the Executive Board of a further plan covering some definite number of future years.

The American Gas Association in convention assembled reaffirms as a cardinal plank in its program, the effective conservation of natural gas, welcomes the cooperation of other agencies, and the support of the industry is hereby pledged to the plan so skillfully worked out by the Main Technical and Research Committee of the Natural Gas Department with the active support and assistance of the Bureau of Mines.

Natural Gas Section

Meeting Reflects Growing Importance of Natural Gas in the Gas Industry

A REVIEW of the address of Chairman H. C. Morris will convincingly show that the Natural Gas Section is well in the van and accomplishing some outstanding achievements. It will further demonstrate that the natural gas branch of the industry is exercising a wise control of its activities, thereby guaranteeing a supply of this marvelous fuel for a long time to come.

Mr. Morris indicated the work that is being done along lines of conservation, research, federal taxation, education, and the like.

"These few examples," said Mr. Morris, "indicate how increasingly active our Association has become in matters relating to natural gas. The entire Natural Gas Industry is moving ahead rapidly. Sales are estimated to have increased 20 percent last year over the previous year and extensions to new territories are now going ahead at a more rapid pace than ever before. It is estimated that

H. C. Cooper, Chairman-elect, Natural Gas Section

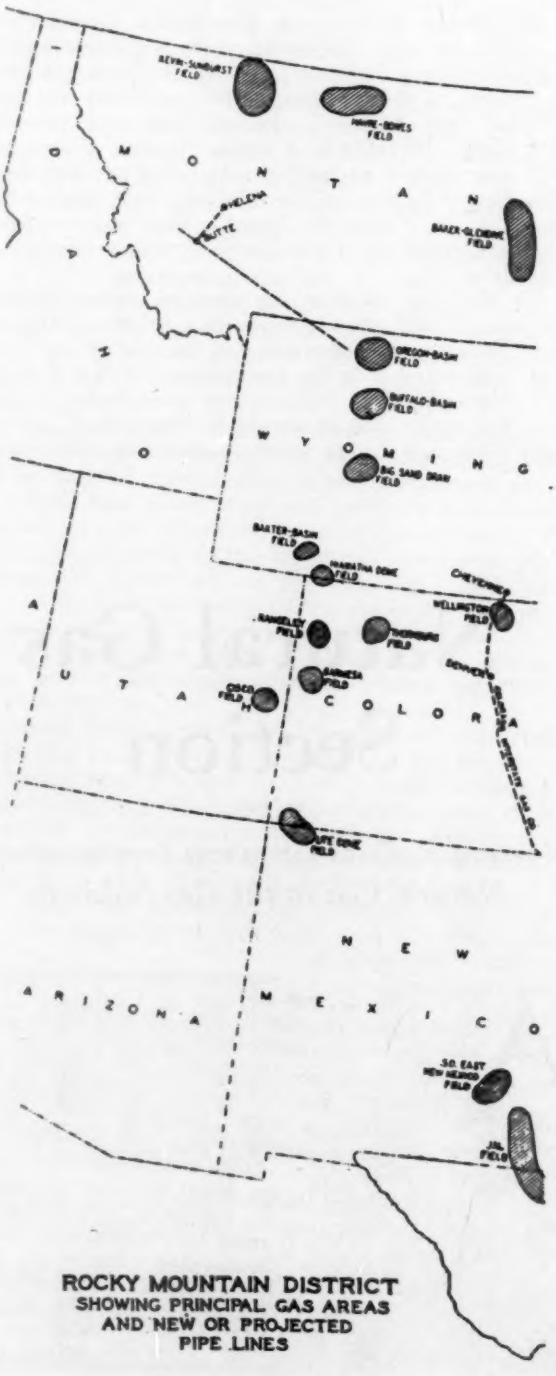
there were in this country at the beginning of 1930 about eighty thousand miles of natural gas transmission lines. A recent estimate shows that twelve thousand miles of additional natural gas pipe lines were either started or projected so far this year. With the completion of the extensions of natural gas service now definitely planned, natural gas will be distributed in thirty-eight states. Of these, eight states and the District of Columbia have come into the natural gas picture this year. Natural gas is now produced in commercial quantities in twenty-five states."

Regarding the extension of natural gas to many communities he said:

"At this time when so many pipe lines are being projected both in the natural gas states and into sections of the country not now served with natural gas, and in cases with the intention of supplying natural gas as a replacement for manufactured gas, it may not be amiss to suggest a word of caution to those responsible for the financial success of such pipe lines; and also to the operators of manufactured gas distributing companies charged with the protection of their company's investment when they take on the distribution of natural gas.

"The officers of the operating companies know and the information should be made available to the Engineers and others making reports for investment banking houses that it is not safe to measure present day probabilities of speed in building up the load by the results obtained by the companies early in the field.

PACIFIC COAST DISTRICT
SHOWING PRINCIPAL GAS AREAS
AND NEW OR PROJECTED
PIPE LINES



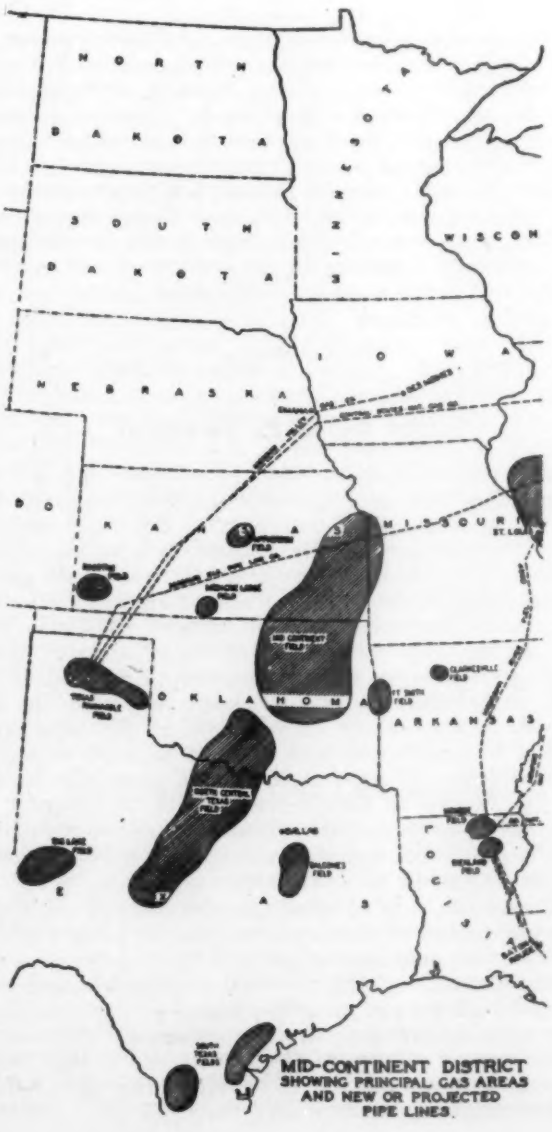
ROCKY MOUNTAIN DISTRICT
SHOWING PRINCIPAL GAS AREAS
AND NEW OR PROJECTED
PIPE LINES

"Ten years ago natural gas was sold for less prices than is now required. There has been an increase in the amount of useful energy secured from a ton of coal, mechanical stokers have brought the comparative furnace efficiencies closer together, furnace oil in home central heating plants and used in automatically controlled devices is a development of the past ten years. Time is required to replace electric heating elements when once installed.

"Possibly the most serious error into which those charged with the success of the new ventures may fall, is that of failing to give due weight to the reduction in volume of sales per customer per month, as a replacement of the service now rendered by manufactured gas. The force of this is so pronounced that, if ignored, the result will be an operating deficit rather than a fair return on the investment.

"Actual operating data from five cities that have recently changed over to natural gas forcibly supports this statement. The cities listed range from 100,000 to 500,000 population.

"The data following compares the period from June to October inclusive in the last year of manufactured gas with the same period for the first year of natural gas,



MID-CONTINENT DISTRICT
SHOWING PRINCIPAL GAS AREAS
AND NEW OR PROJECTED
PIPE LINES.

APPALACHIAN DISTRICT
SHOWING PRINCIPAL GAS AREAS
AND NEW OR PROJECTED
PIPE LINES

this five month period being one in which no gas would be required for space heating and gives an accurate city wide comparison except as the volume of sales be favorably affected by natural gas rates and sales efforts.

	City 1	City 2	City 3	City 4	City 5	Average
Btu. Mf'd Gas	550	530	560	525	600	553
Btu. Nat. Gas	980	980	1070	965	965	992
Volumetric ratio 90	68.5	68.2	63.5	66	71	67.4
Btu. ratio 90	122	126	121	120.5	114	120.7

"Such evidence as this forces the safe operator to the conclusion that the financial integrity of his property can be easily jeopardized by any schedule of rates that fails to provide substantially the same net revenue for the same service rendered as that now secured from his manufactured gas sales. A proper schedule should provide for the customer account cost in the first step, thus permitting low enough steps to successfully compete for the large volume of the sales in the heating load, which is necessary both to the company and the customer if the latter is to secure the savings and other advantages that are usually expected."

Mr. Robert W. Hendee, Oklahoma Natural Gas Corporation, Tulsa, in his paper, "Natural Gas in the United States," cited the enormous increase in the consumption of natural gas from 300,000,000,000 cubic feet in 1906 to 1,800,000,000,000 cubic feet in 1929, and spoke of the necessity of proper conservation.

His paper dealt with an analysis and summary of the amounts of natural gas produced by the various states throughout the United States as well as prospects for finding additional gas. Herewith are reproduced from this paper several maps showing the location of the principal natural gas areas and new or projected pipe lines.

Technical Section

Natural Gas Occupies Important Part in Many Papers and Reports Presented

NATURAL GAS problems invaded the Technical Section, as well as the other divisions of the A. G. A. activity at Atlantic City. It furnished the major basis on which the committee on economic and engineering survey reported, supplemented by papers prepared by George Wehrle and E. B. Swanson, and had large influence on a number of other engineering discussions throughout the program. The report by R. G. Griswold for the committee on economic and engineering survey of the gas industry makes clear why this importance is so clearly recognized.

"How plentiful natural gas is, is illustrated by the fact that it has been sold for 2c a thousand on contracts, when it could be sold at all. This is equal to 50c a ton for coal or 3 mills per gallon for oil. Such cheap material in such large quantities, together with a period of easy financing, has started what may continue to be a long period of exploiting the long distance transmission of natural gas.

"Forgetting for the moment the different interests that might be involved and looking at the matter from a community point of view, here is a great natural resource which can hardly be held back, in other words, which would eventually be dissipated if not used, and here are communities in the United States who could utilize such fuel to advantage, and also there is in the United States money available to be invested in any worthwhile enterprise. Therefore, it would seem important to see if this gas cannot be delivered to customers with benefit to them and to the producer of the gas and to the investing public. Just how the total benefit shall be divided between the several interests will have to depend on circumstances and negotiations. The American Gas Association should logically take an active interest in the correct solution of all the problems connected with this new development."

(Figures represent million cu.ft.)

Uses	*1925*	*1926*	*1927*	*1928*	*1929*
Domestic	272,146	289,175	296,036	320,877	359,853
Industrial					
Carbon black manufacture	140,366	130,321	144,087	175,137	261,107
Fuel for field operations	423,524	478,188	549,455	573,698	705,083
Electric power plant fuel	46,521	53,207	62,919	77,326	112,707
Fuel at refineries	87,842	121,440	123,395	114,980	103,729
Other industrial plants	218,040	240,513	269,352	305,991	374,972
Total	1,188,439	1,312,853	1,445,244	1,567,979	1,917,451
		Percentages			
Domestic	22.90	22.03	20.48	20.47	18.77
Industrial					
Carbon black manufacture	11.81	9.93	9.97	11.17	13.62
Fuel for field operations	35.64	36.42	38.02	36.59	36.77
Electric power plant fuel	3.91	4.05	4.35	4.93	5.88
Fuel at refineries	7.39	9.25	8.54	7.33	5.41
Other industrial plants	18.35	18.32	18.64	19.51	19.55
Total	100.00	100.00	100.00	100.00	100.00

Trends in Natural Gas Consumption. Data from U. S. Bureau of Mines

R. G. Griswold, Chairman-elect, Technical Section

It was also pointed out that a full development of these possibilities necessitates negotiations with a class of customers to whom large amounts of natural gas can be sold "without a burdensome obligation for continuity of service, but at a price which competition forces below the cost of making manufactured gas." It is urged that such sales be promoted with the maximum of industrial engineering skill, even though they do not afford what seems to be a large profit, because they do contribute materially to the bearing of cost burdens under that vague heading, "overhead."

Paper by E. B. Swanson

The quantities of natural gas available and the demand therefore defy accurate statistical analysis, but E. B. Swanson, chief economist of the U. S. Bureau of Mines, presented to the convention a summary outlining the scope of the major fields from which gas is being drawn in the Monroe-Richland area of Louisiana, the Texas Panhandle, the new fields of California, and the lesser fields of the Allegheny Mountain states. That such reserves are not adequately developed as yet for public-utility supply is clearly indicated in this report. From 60 to 70 per cent of the production occurs in conjunction with oil, and in many instances after removal of gasoline the gas is wastefully burned in the crudest of carbon-black plants or dissipated to the air unburned. Mr. Swanson's estimate is that nearly a half billion feet of gas per day is being wasted in the Panhandle of Texas alone.

Prospective life of these gas fields is of great importance to those owning pipe lines or otherwise dependent on pipe-line operations. All of the principal fields discussed by Mr. Swanson promise adequate supplies for all present or early prospective pipe-line needs for periods varying from 25 years upward. Trends in the character of use of the gas of the United States are well shown by the table which this Government representative presents.

	Manufactured Gas Calendar Year 1927	*Natural Gas Year Ending May 31, 1930*	*Increase Col. 2 over Col. 1*
Number Domestic Customers	65302	62614	−2688 or 4.1%
Number House Heating Customers	372	6414	+6042 or 1620.0%
Number Commercial Customers	5366	5168	−198 or 3.7%
Total No. Dom. Rate Customers	71040	74196	+3156 or 4.5%
Sales per Domestic Customer	29.20 MCF	14.90 MCF	−14.30 or 49.0%
Sales per House Heating Customer	733.30 MCF	309.50 MCF	−423.80 or 57.8%
Sales per Commercial Customer	200.00 MCF	129.00 MCF	−71.00 or 35.5%
Sales per Avg. Dom. Rate Customer	45.73 MCF	48.40 MCF	+2.67 or 5.8%
Sales Domestic Rate	3252107 MCF	3589810 MCF	+337703 or 10.4%
Sales Industrial Rate	—	1017901 MCF	+1017901 —
Total Sales	3252107 MCF	4607711 MCF	+1355604 or 41.7%
B.t.u. per Domestic Customer	11.68 M³	14.90 M³	+3.22 or 27.5%
B.t.u. per House Heating Customer	293.32 M³	309.50 M³	+16.18 or 5.5%
B.t.u. per Commercial Customer	80.00 M³	129.00 M³	+49.00 or 61.4%
B.t.u. per Avg. Domestic Rate Cust.	18.29 M³	48.40 M³	+30.11 or 164.5%
B.t.u. Sales Domestic Rate	1300842.80 M³	3589810.00 M³	+2288967.2 or 176.5%
B.t.u. Sales Industrial Rate	—	1017910.00 M³	+1017910.0 —
Total B.t.u. Sales	1300842.80 M³	4607711.00 M³	+3306868.2 or 255.0%

Denver Conditions before and after Natural Gas, as reported by George Wehrle

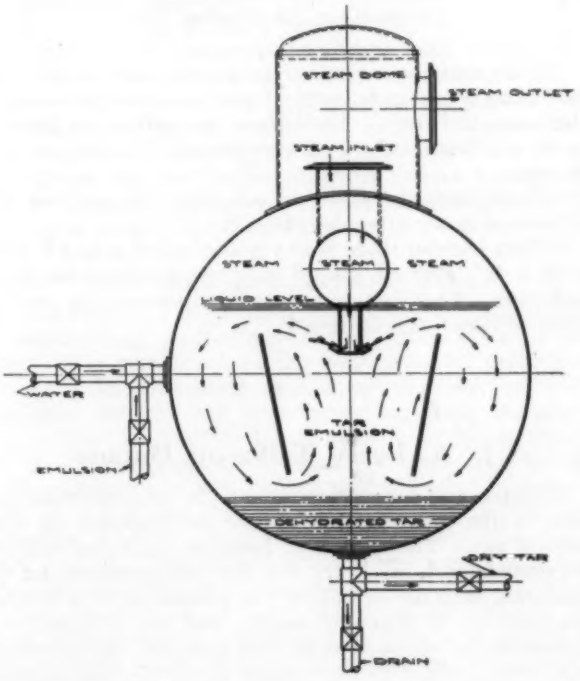
Gas supply for Denver involves many technical developments which have already been rather fully reported in AMERICAN GAS JOURNAL. Mr. George Wehrle, who discussed these subjects for the Technical Section, also presented a paper specially written for the Journal in the October issue. In his convention report Mr. Wehrle gives few additional data of interest.

In June, 1928, with the supply of natural gas to Denver it became important to develop intensively industrial loads. This was particularly important since the large increase in the heating value of the gas from the 400 B.t.u. manufactured gas previously supplied forecast a decline in volume of output for the services formerly rendered. By approximately one year from the date natural gas was first supplied, the industrial developments at Denver represented a 90-per cent increase in send-out of heat per year. Ten months later the thermal energy supplied by gas service in that community ran 300 per cent of the rate of send-out when natural-gas service began. Thus, in less than two years the gas company in that community had taken on three times as much of the energy business of its community as ever before rendered.

Saturation of gas with water, treatment with an oil fog, and odorization with Calodorant have all been practiced from the outset at Denver. As a result, that community has not suffered any increase in unaccounted-for gas, any new difficulties with meter diaphragms, nor dust troubles. The current practice is to maintain from 75 per cent to 90 per cent saturation with moisture except in extremely cold weather, to use about one gallon of oil as fog per million feet of gas sent out, and to use 2.5 to 3 gallons of Calodorant per million cubic feet of gas. The result of the last-named addition has been the disclosure of numerous bad leaks, correction of which has not only eliminated possible explosion dangers, but also accomplished important saving from leakage losses.

Manufactured Gas Dehydration

Dehydration of manufactured gas has as its objective reducing of moisture content to approximately the same condition as that reached in proper wetting of natural gas. This point was emphasized by J. E. Spindle in reporting for the committee on dehydration in order that it could be clearly understood that there was no conflict in objective between the two practices which some have thought to be contrary in purpose. The committee report summarizes the experience of several communities having dehydration plants, Grand Rapids using hygroscopic liquid from the sulphur-recovery system, Hammond, Indiana, using a similar hygroscopic absorbant, and Norfolk, Virginia, using calcium chloride in a very recent installation. The committee has considered the results of dehydration on naphthalene complaints, frost complaints, rust complaints, water stoppages, meter conditions, and the magnitude of losses of unaccounted-for gas. They point out that with respect to unaccounted-for there is a widely spread mistaken impression that dehydration significantly reduces the volume by removal of part of the water vapor and therefore results indirectly in a serious cost. The report shows that this decrease in volume is only 0.1 to 0.3 per cent.



Tar Dehydrator combined with Exhaust of Gas Machinery Company. Steam Accumulator Development

Operating data indicating the range of costs for plants from which such information can be had has been summarized by one of the subcommittees of this group and is reproduced in the accompanying table. It should be noted in this connection that in all instances the present load is very much less than the plant capacity and that the operating items per M are, therefore, significantly higher than they would be in systems operating nearly at capacity. Operating and storage considerations presented by this subcommittee are also worthy of special note.

"Experience indicates that if the gas is properly conditioned before being sent to the dehydrator the plants are very easily operated and controlled. However, if the gas at the dehydrator inlet contains appreciable quantities of either naphthalene or ammonia, trouble is readily encountered. The naphthalene crystalizes due to the comparatively low temperature of the brine and causes stoppages either in the shell or the piping. Ammonia in the presence of carbon dioxide combines chemically with the brine to form ammonium chloride and unless the brine is reconditioned by the use of lime it must soon be discarded.

"Proper scrubbing and cooling of the gas ahead of the dehydrator will eliminate these troubles and will also decrease the load on the dehydrator due to the lower

water content of the inlet gas. It is generally cheaper to reduce the water content to a reasonable figure in the final cooler rather than in the dehydrator.

	Plant No. 1	Plant No. 2	Plant No. 3
Capacity	4,800 M/day	3,000 M/day	10,000 M/day
Present Load	2,900 M/day	1,500 M/day	5,000 M/day
Operating Labor	$0.00090/M	$0.00590/M	$0.00063/M
Power	0.00019	0.00050	0.00026
Water	0.00000	0.00030	0.00036
Steam	0.00234	0.00100	0.00216
Brine	0.00014	0.00240	0.00044
Maintenance	0.00035	0.00000*	0.00087
Total	$0.00392/M	$0.01010/M	$0.00472/M

*This plant has been in operation for only a short time and has had no maintenance to date.

Cost of Gas Dehydration. Data presented by Subcommittee on Operation for Three Going Plants

"Plant number one stores the gas in water sealed holders using a one-inch layer of gas oil over the water in the tanks and cups. Tests show an increase in gas dew point of from two to three degrees F. due to such storage.

"Plant number two does not store its gas, but distributes directly after dehydration.

"Plant number three stores gas in water sealed holders with a ¾" layer of gas oil over the water in the tanks and cups. This storage results in an increase in gas dew point of about two degrees F."

J. A. Perry Talks on Butane

Propane and butane promise to be as important factors in the gaseous fuel supply of America as does natural gas. This is evident from the statistical analysis presented by J. A. Perry for the subcommittee on cooperation with the oil industry in utilization of petroleum products. The potential supply and the prospects for utilization of these two natural-gasoline byproducts is not limited alone to the natural-gas fields, since analogous materials are available as incidental products at oil refineries. Mr. Perry points out that—

"Our problem then appears to be—can we take these higher forms of hydrocarbons such as propane and butane either in the gaseous or liquid state and use them to our advantage?

"Tests show that the relative costs of heating with butane and gas in many operations in industries will permit butane to replace gas on a B.t.u. basis. The cost of butane will include the F.o.b. charge at point of shipment, plus freight, fixed charges on storage and conversion equipment and some labor costs. The fixed charges will vary from 12 cents to 2½ cents per million B.t.u.'s, for a heat use ranging from five hundred million (500,000,000) to two thousand million (2,000,000,000) B.t.u.'s per month. Butane is, therefore, a serious competitor for industrial gas when available at a suitable price.

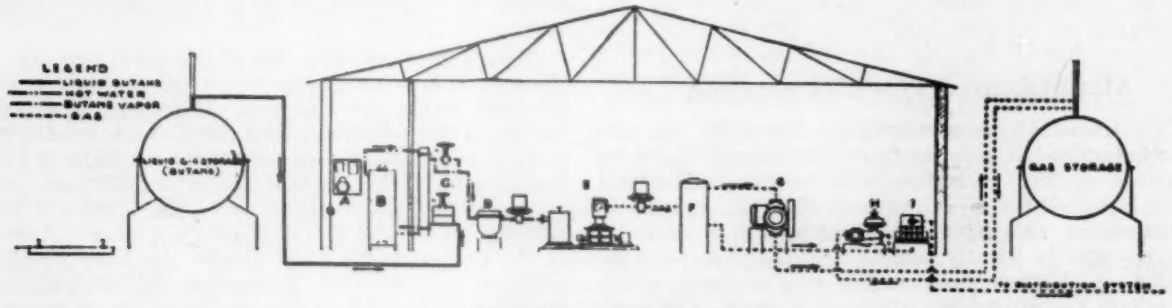
"It seems to me that we have here the best methods and the most economical ways not only to use this material for small installations but for the development of our business. The distribution system can be laid out to fit in with the future ordinary gas supply and practically every cross roads settlement or town can be economically supplied with gas. We can reach as many customers with gas as with electricity. I think every gas company or holding company should seize upon these methods, make suitable trial installations and if these are found satisfactory, then they should be taken up and developed by the gas companies rather than by promoters through new agencies.

"Does not bottled gas open up the way to serve in advance isolated suburban customers? It might pay every fair sized company to investigate the possibilities of serving bottled propane gas to all possible customers on routes of a 25-mile radius.

"But these small companies and these small cross road towns and isolated or route customers will not be sufficient to utilize all of the potential supply. Study and research are necessary by both the natural gas industry and the manufactured gas industry to determine how best to utilize these liquefied petroleum gases not only in their present high form value but how to reduce economically these high form values so that the gases can be used in place of or to augment the natural and manufactured gases as now supplied."

Review of Distribution Problems

Distribution problems of the industry were reviewed for the convention by J. H. Braine, chairman of the distribution committee. Since a large part of the material in that committee's report is merely an elaboration and revision of the documents presented at the Distribution Conference, and already reviewed in earlier issues of the Journal, it is necessary here only to touch on a few of the most important points in this committee's activities. Those desiring the committee reports in full can, of course, have them for the asking from A. G. A. headquarters. It is of importance to present here the following concise review of outstanding problems facing the distribution engineer in the immediate future, as summarized by Mr. Braine:



Diagrammatic plant flow sheet

A—Control board
B—Storage water heater
C—Vaporizer
D—Butane vapor meter
E—Proportioning machine
F—Surge tank
G—Compressor
H—Station regulator
I—Station meter

Butane Plant Design—Philfuels Company

"Liberal appropriations have been made to carry on the Pipe Joint Research at the Cleveland Laboratory and valuable data have been collected and research work of equal value is under way.

"It seems as if no reasonable appropriation should be withheld for this work and certainly no distribution engineer should put a single joint under ground until he has satisfied himself that it is the best procurable for the service to which it is to be subjected. Tradition or precedent should not be allowed to displace careful thought and exact knowledge in the selection of pipe joints."

Pipe Coatings and Corrosion

"Next to the selection of the proper pipe joints, the protection against corrosion and electric influences of the immense investment in steel pipe lines throughout the country is of paramount importance. Very fortunately this matter is in the hands of competent engineers both in the gas industry and the U. S. Bureau of Standards, and recent reports indicate that very great progress has been made. This research work should receive the unstinted support of all distribution engineers, and the committee in charge should receive any contributions Association members think would be of value. A full solution of this matter must be reached at an early date."

Maintenance of Existing Distribution Systems

"The proper maintenance of distribution systems, particularly those constructed with bell and spigot joints, is becoming more and more of a problem in congested metropolitan areas where a multitude of other subsurface structures exist. This situation is, no doubt, made more difficult in many localities by the introduction of drier gas, of lighter gravity, and under higher pressures.

"Cooperation with other utilities such as telephone, electric light and power companies in making leakage surveys will be found of much value. Such surveys should be conducted under the close supervision of competent engineers."

Unaccounted-for Gas

"Recent surveys in many localities, in connection with a study of unaccounted-for gas, have resulted in a reduction of pipe line pressures at off-peak hours and a consequent reduction in the unaccounted-for figure. Further studies of this question, it would seem, are warranted."

Distribution Design

"Much attention has been given to the design of transmission lines of large size and considerable length, but the same attention has not been given to the design of consumers' or district main systems. When it is considered that approximately 20 miles of consumers' mains are laid for each mile of transmission main, it is obvious that the engineer has an opportunity for a considerable saving in investment by close study of small main design."

"The industry is faced with problems of service and maintenance which were unknown in former years, and the public are demanding more and more in the way of service. Profitable studies can be made in connection with the servicing of industrial appliances, central house heating plants, refrigerators, etc."

Transportation Equipment

"The selection of the proper type and capacity of automatic equipment is a subject which has received little, if any, attention by the gas industry and yet the operation and maintenance of even small fleets of cars comprises no inconsiderable item of yearly expense. It is felt, moreover, that an adequate and properly maintained fleet, presenting a creditable appearance on the streets, is a very valuable factor in securing the respect and good will of customers."

Coating pipes to prevent corrosion is increasingly important with the development of long-distance high-pressure transmission systems. Three separate technical discussions on various phases of this subject were presented as parts of the report of the subcommittee on pipe coatings and corrosion, all of them from technical staff members of the National Bureau of Standards. Dr. Scott Ewing, the A. G. A. research associate at the Bureau, summarized the conditions under which practical field tests are being made by burying a large number of pipe samples in a wide variety of soil conditions throughout the country.

The correlation of soil characteristics with corrosion phenomena is an important possibility being considered. This subject was discussed by I. A. Dennison, who reported in a preliminary way on some of the possibilities of anticipating by soil studies the degree of corrosiveness in order to apply protective coatings where most needed and not involve expenditures where such coatings are probably not required. In discussing the results thus far obtained, Mr. Dennison says:

Conducting Soil Corrosion Tests

"The results of this investigation show the importance of determining the corrosiveness of soils prior to the laying of a pipe line and the application of protective coatings. In conducting such a survey, however, it is important that the soil types occurring along the prospective line be identified and their boundaries established. Since abrupt changes in type may occur within a short distance in a region of complex distribution of soils, it is obvious that collection of soil samples for corrosion study at arbitrary distances may give misleading results. Soil identification in any region calls for specialized knowledge of the soils of that region. This is particularly true of localities in which changes in topographic features, which indicate change in soil type, are too slight to be observed by anyone unfamiliar with the soils in question."

Even when properly originally applied, the problem of maintenance of pipe coatings intact against soil stresses is an important one. This project is under investigation at the Bureau and was reported on by Gordon N. Scott, who is an American Petroleum Institute research associate engaged on this work. The project is in such early stages that no important conclusions can yet be presented, but Mr. Scott's early work has demonstrated the importance of determining both the character and the means for control of such soil stresses in order that protective coatings initially satisfactory may remain so during considerable service life. The results of this investigation undoubtedly will have an important bearing on methods of back filling of trenches, among other things.

Heavy Fuel Oil for Water Gas

Substitution of a heavy fuel oil for gas oil in the manufacture of carburetted water gas continues to interest widely not only engineers making water gas regularly, but also those who depend on this type of manufacture for peak load operation to supplement base loads of either coal gas or natural gas. Mr. P. T. Dashiell, of the Philadelphia Gas Works Company, reported fully on the method now most widely used for this purpose. A second method, involving marginal generator blasting, has also been developed but is not at the present time in general use. Hence, the following summary from Mr.

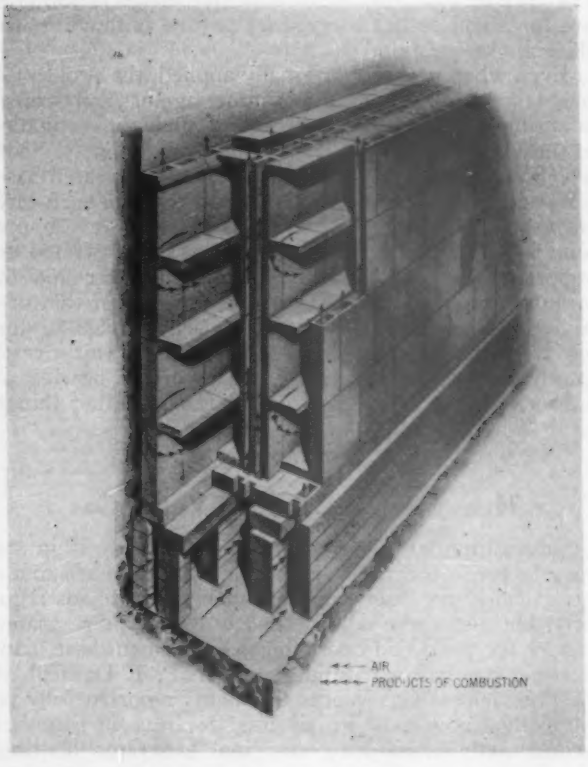
Dashiell's paper is limited to the procedure commonly applied.

"The method in use today for carburetting with high coke oil is the empty carburetter atomizing spray method. This can be used with any oil whose coke content is under 14%. This limit is given because no oil of higher coke content has been tried. Its principles are briefly as follows:

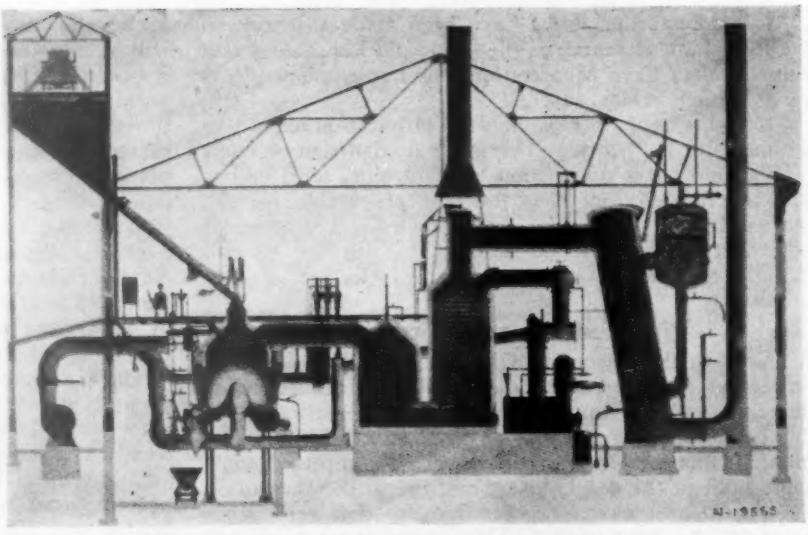
"There is enough heat stored during the blow in the roof, sidewalls and floor of the usual carburetter to vaporize all the oil that is to be used during the run period to make, say, a 530 B.t.u. gas. If this amount of oil is vaporized entirely within the carburetter, all of the distillation residue of the oil will be deposited within the carburetter chamber. The heat from the carburetter walls, floors, etc., must be transferred to the required amount of oil during the oil admission period of the run. To accomplish this, the oil must be divided or atomized to such an extent as to permit this exchange of heat. When the oil is vaporized within the carburetter and its vapors mixed with steam and blue gas coming over from the generator, the mixture passes to the super-heater checker brick in the usual way and the hydrocarbons of the oil are re-arranged by heat so that most of them become permanent gases, at least permanent under the conditions of temperature and pressure met with in the works and distribution system. In other words, the oil vapor is "fixed" in the usual way.

"The advantages of this method of operation with any oils, particularly with high coke oils, are as follows:

1. Uniform heat treatment of the oil because heating surfaces do not foul.



Vertical Duct Recuperator. Development of Improved Equipment—Russell Engineering Corporation



U. G. I. Mechanical Generator; Carburetted Water Gas Set

2. Saving of the labor of removing foul checker brick.

3. Saving of loss of brick through breakage.

4. Reduction of idle time of the set due to not having to remove fouled brick from the carburetter, therefore, more working days per set per year.

5. Reduction in resistance of passage of blast, consequently more uniform fire conditions and more uniform make of gas per day.

"Of course there is a limit to the amount of oil that can be vaporized in a given carburetter in a given time by the heat available from the top, bottom and sidewalls. If the rate of make and required calorific value of the gas are such as to require such a large admission of oil during the run period that the heat required is more than the carburetter can give, it is necessary to admit some of the oil to the top of the fire during the uprun period and have some of the vaporizing done there. For instance, with a set making at the rate of 6,000 M cu. ft. of 530 B.t.u. gas, it will probably be necessary to put half of the oil on the fire each run. To provide for this a second oil meter and spray with connections must be provided. The oil going to the fire need not be atomized, but should be distributed properly on the fire top. The residuum of the oil which goes to the fire top is deposited in the fuel bed and used up as generator fuel.

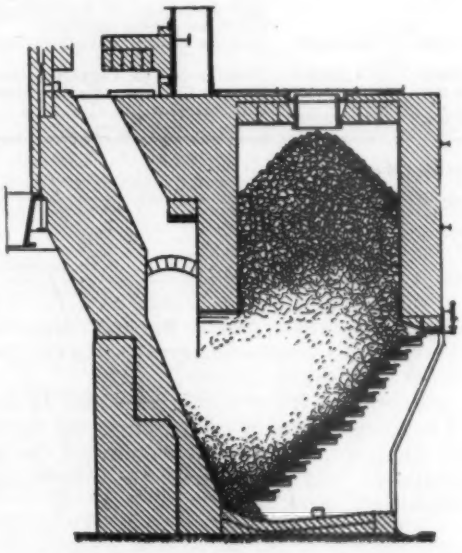
"Fuel oils obtainable vary greatly in value as carburetting agents, but none have been found which have no value. The poorest that have been tried—cracking plant tars—give a carburetting value of 65,000 to 70,000 B.t.u. per gal. on the laboratory set. The best are from straight run residues, some of which have shown as much as 104,000 B.t.u. per gal. Mixtures of these show values in between.

"Set capacities, except those of mechanically clinkered sets, show practically no reduction as compared to operation with low coke gas oil. This is because the carbon deposited in the carburetter can be removed within the time of fire clean of the generator. With mechanically clinkered sets, using an oil of, say 9% coke content, there will be a loss of perhaps one hour per day, or about 5%, as any shut-down time to clean carburetter is real lost time, there being no shut-down time to clean the fire.

"Generator fuel consumption shows a marked reduction as compared with gas oil operation. This reduction will be greater as the coke content of the oil is greater and as the percentage of oil used on the fire is greater.

"Some of the fuel oils have high sulphur content, al-

though none have so far been met with that show more than 4.5% and some are in use whose sulphur content is as low as 0.5%. The former may be expected to yield a gas having 330 grains of H_2S and 35 grains organic sulphur per 100 cu. ft. Naphthalene will be produced but to probably a smaller degree than with many types of gas oil.



Modern Stop-Grate Producer described by F. J. Kennedy West Gas Improvement Company

"At present comparative prices of fuel oil and gas oil, the economies to be gained through the use of the former are so great as to justify the burning of the tar as boiler or other fuel at fuel oil prices if no more advantageous method of disposal can be found.

"Fuel oil is being used today in large quantities at the rate of some 80,000,000 gals. per year with efficiencies which compare favorably with those gotten with average quality gas oil. A study of market prices of the two grades of oil will give some idea of the savings being effected."

Bituminous Coals for Generator Fuel

Selection of bituminous coals for generator fuel in water-gas manufacture has been the object of an extended investigation of one of the water-gas subcommittees working under the chairmanship of E. S. Pettyjohn in experimental studies of the University of Michigan. To supplement the mere announcement of types of coal for which practical operating results can be had, the committee has undertaken to develop a test code by which operators may ultimately judge the quality of any coal submitted to them for this use. The results of the investigations thus far are expressed in the following conclusions:

"1. The chemical tests are not of great value in predicting physical properties, and they are not by themselves suitable for the evaluation of water-gas coals. They are valuable in preparing specifications to control the purity of, and in fixing prices for different coals obtained from the same or similar seams.

"2. The modified shatter test may be successfully used to predict the probable degradation in handling the coal, and the loss as fines in screening.

"3. The plasticity determination permits both accuracy in procedure and interpretation of results. Its further development is very desirable.

"4. The agglutinating-power, and agglutinating-value determinations, might be developed to the point where they would assist in predicting the behavior of the coal in the generator

"5. The thermal-shock test does not provide any additional information which cannot be more accurately obtained through a properly conducted plasticity determination."

Stein on low Water Gas

Low-gravity water gas for mixing with coal gas has continued as one of the projects under a subcommittee headed by Louis Stein. This committee emphasizes the importance of such development in securing low investment cost, operating flexibility, and high capacity of equipment, as well as low gravity of the product. A new series of tests made during recent months at St. Paul was summarized by Mr. Stein in which the following conclusions can be drawn.

Water gas can be made of 0.47 specific gravity and 550 B.t.u. using generator fuel of two-thirds coal and one-third coke at 105 M. per hour in an 11-foot set for a period of five hours. Gas of 0.54 gravity can be made under similar conditions at 155 M per hour for nine and a half hours. Operation for longer periods than those named involve difficulties through the decided tendency of the fire to plug. The tests show that two-thirds coal and one-third coke give less difficulty than the reverse percentages.

In connection with this committee report United Gas Improvement, which has acquired the Willien-Stein-method for making low-gravity water gas, announces certain generalizations which it believes are average results for the method, as follows: In an 11-foot set, make per 24 hours is 11,500 M with fuel consumption of 10.6 pounds per M and 4.94 gallons of oil per M, making gas 0.58 specific gravity and 530 B.t.u. per cubic foot. With increased blower capacity it is believed that the gravity can be reduced to 0.538. Dry tar made in such a set analyzes 12 per cent free carbon, 4.5 per cent sulphonation residue, and, in general, about the same distillation characteristics as normal water-gas tar.

Affect of Moisture Content on Purification

Moisture content of oxide used for purification has an important bearing both on the rate of absorption of hydrogen sulphide and also on revivification. The subcommittee studying these problems under the chairmanship of E. J. Murphy reported the extent to which practical works data could be obtained and call attention to the important way in which these works data confirm the extended research made at Johns Hopkins University. This research was completely reported on by W. J. Huff and C. G. Milbourne, who summarized their paper in the following language:

"The lack of adequate information upon the functions of water vapor in the sulphiding of iron oxide and in the rivivification of the fouled material lead to an experimental investigation of these topics. Preliminary considerations dictated the development of a laboratory procedure for sulphiding iron oxide under observation with the control of variables such as temperature, humidity, and surface. The test has been described in some detail, and results are presented to show that, under the conditions established, the most favorable relative humidity for sulphiding was an intermediate value, approximating 65% at 38° C. The laboratory investigation showed

Company	Location	No. of Ovens	Coal Capacity per Oven Net Tons	Annual Coal Capacity Net Tons	Rated Maximum Daily Coal Gas Production—cu.ft.	Ovens designed to be heated with the following types of gas
New England Fuel and Transportation Co.	Everett, Mass.	149	16.82	1,115,000	44,182,000	Producer Gas (Coke-Oven) or Blast-Furnace Gas
Donner Hanna Coke Corp.	Buffalo, N. Y.	51[1]	12.05	359,000	13,600,000	Coke-Oven Gas
Illinois Steel Co.	Gary, Indiana	138[2]	13.85	1,196,000	45,876,000	Coke-Oven Gas, Producer or Blast-Furnace Gas
Colorado Fuel and Iron Company	Pueblo, Colo.	31[3]	18.2	274,000	10,164,000	Coke-Oven Gas
Weirton Steel Co.	Weirton, W. Va.	25[4]	14.2	215,000	8,184,000	Blast-Furnace Gas or Coke-Oven Gas—Equipment for Blast-Furnace Gas Heating Being Installed.
Consolidated Gas Co.	Hunts Pt., N. Y.	37[5]	13.94	347,000	13,504,000	Producer Gas (or Coke-Oven Gas)
Consumers Power Co.	Jackson, Mich.	11[6]	4.4	35,000	1,568,000	Producer Gas (or Coke-Oven Gas)
Hudson Valley Fuel Corporation	Troy, N. Y.	31	15.68	266,000	9,996,000	Producer Gas (Coke-Oven) or Blast-Furnace Gas
	Total	473	Total	3,807,000	147,074,000	

[1]150 Koppers type ovens in operation
[2]700 Koppers type ovens and 138 Becker ovens in operation in addition to new contract for 138 ovens
[3]120 Koppers type ovens already in operation
[4]Making a total of 111 Becker ovens
[5]Making a total of 111 Becker over
[6]Making a total of 26 Becker over

Becker Oven Plants under Construction in United States

that revivification is relatively very much slower than sulphiding, and in many plants this slow rate is a determining consideration. The rate of revivification is very markedly affected by humidity conditions and increases rapidly with increasing humidities. In consequence, purification procedures involving simultaneous revivification in place require constant high humidities. The use of humidities approaching saturation is, however, inadvisable if conditions permit the free deposition of liquid water as this deposition greatly lowers the efficiency of the purification process.

"The fundamental information developed in the laboratory was applied to some of the purifying operations of a large gas plant. The results confirmed the laboratory conclusions and emphasized the importance of proper humidity control."

Industrial Gas Section

Load-Building Topics Well Handled at Meeting of Industrial Gas Men

UNDER the direction of Chairman C. C. Krausse, Consolidated Gas Electric Light & Power Company, Baltimore, Md., a program of high interest was presented. Among the topics handled were included the baking load, heat treating furnaces, pottery baking, the problems incident to a change-over to natural gas and others. A particular feature of the papers was that they were devoid of verbiage and furnished data and information that can be applied under many conditions.

Mr. T. J. Gallagher, The Peoples Gas Light and Coke Company, Chicago, dealt with an always pertinent subject in his paper, "The Economic Position of Gas Fuel in the Corner Bakery."

Relative to a survey of potential business in this field Mr. Gallagher furnished the following data:

D. W. Chapman, Chairman-elect, Industrial Gas Section

"The commercial baking industry in the United States includes 17,000 firms or businesses, varying from the one oven plant of 200 loaves capacity to the chain store bakery producing 1,000,000 loaves per week. Fifty-five million pounds of bread are baked a day, in addition to enormous quantities of cakes, cookies, crackers, pies and pastries of all kinds. One authority estimates that this latter group equals the former.

"Assuming that it requires two cubic feet of 535 B.t.u. gas to bake one pound of bread, we have a possibility of selling 220,000,000 cu. ft. of gas per day to the

baking industry. At a rate of 60 cents per M cu. ft. the bakery business is a potential load producing a gross revenue of $132,000 per day."

"At the outset we stated that there were 17,000 bakery firms in the United States. This figure includes chain bakeries, having two or more plants, so that as a matter of fact, there are 28,000 individual shops. Of these, about 20,000 are Corner Bakeries in active operation. Experience has shown that the average monthly revenue from the Corner Bakery is approximately $80 which, for 20,000 bakeries, is $1,600,000 per month or $64,000 per day. That is, a little less than half of the total estimated potential revenue from the entire bakery business will come from the Corner Bakery."

HEAT BALANCES ON SMALL BAKE OVENS HEATED WITH VARIOUS FUELS

	Heat Input B.t.u.	*Heat Output B.t.u.*	*Losses Due to Radiation*	*Flue Gas and Other Losses in B.t.u.*	*Efficiency %*
Gas	1000	300	500*	200	30%
Electricity	550	300	250	0	55%
Coke	1400	300	500	600	21%

*The newer designs of gas-fired bake ovens show considerable reduction in losses due to radiation. With improved construction and better insulation, it is expected that radiation losses will be further reduced.

A COMPARATIVE COST BETWEEN COKE, GAS AND ELECTRICITY

	Efficiency	*B.t.u./Unit*	*Cost/Unit*	*Available B.t.u. for 1c*
Coke	21%	12,500/lbs.	$11.50/ton	4,565
Gas	30%	530/cu.ft.	$ .75/M cu.ft.	2,120
Electricity	55%	3,412/kw.hr.	$ .025/kw.hr.	750

From the above figures it is evident that the bare fuel costs with gas are roughly twice as much as with coke, but consideration must be given to the collateral advantages of gas fuel as stated elsewhere in this paper. Electricity costs approximately three times as much as gas.

Mr. Gallagher then went on to discuss the characteristics of the corner baker, saying that many times he was of foreign extraction and hence somewhat set in his ways. He further stated that many of the shops were unsanitary and using antiquated baking devices. He felt, nevertheless, that a campaign of education would show such a shopkeeper why he was losing business to the more progressive baker, and ultimately induce the backward baker to install modern equipment.

"Bakers who have already accepted gas as a fuel," said Mr. Gallagher, "have been made conscious of certain advantages which they previously did not acknowledge. These advantages, some of which are enumerated below, can be pointed out to the prospect:

"1. They can repeat quality without danger of burning or of soft centers—they get just the proper bloom on their loaf, the same ruddy crust on their pies, and the same delightful lightness to their cakes.

2. They get a quick fire—and save both fuel and time.

3. The fire is out when the baking is done, which means another saving in fuel.

4. They have no ashes—no coal—no dirt.

5. No furnace fireman is necessary.

6. Sometimes they even do the job with less help.

7. The whole interior is cleaner—more sanitary.

8. The bakers work in comfort because the heat is inside the oven, not outside.

9. They can control the temperature—getting medium heat for pastries—heavier, steadier temperatures for heavier baking—all at the right time and at the minimum cost.

10. Their repair costs are greatly reduced.

11. With clean gas heat, their ovens are always clean—with no expense for cleaning oven or flues.

12. With ovens which do not require constant supervision, these bakers have more time for themselves in the open air and with their families. Their Sundays are their own.

13. They can devote more time to the front of their shops fraternizing with their customers and building up good will.

14. These bakers realize that they have a right to modern methods. Their wives used to beat their rugs in the backyard, until some wise man invented the vacuum cleaner. Now they no longer need to be slaves to solid fuel in their ovens.

15. Time is money and gas saves time."

Mr. Gallagher gave the following items for the gas men to bear in mind relative to the economic situation of the corner bakery.

"1. The Corner Bakery business is of a peculiar type: It necessitates tireless study of those who operate it.

2. Nationality plays an important part in the life and work of the Corner Baker. He caters to national tastes and customs. (This fact tends to hinder the 'Chains' from supplanting the Corner Baker.)

3. The public is buying only 19.7% of its sweet goods from the Corner Baker. It would buy more if it could get what it wanted. This fact should be used in selling *gas* to this type of customer.

4. Wood and coke are the two most common fuels used by the Corner Bakery. Gas does not need to be as cheap as coke or wood in order to be bought by the Corner Bakery, but the difference in price must be such that the baker can see where it offsets their inconveniences and disadvantages.

5. The chief competitor of gas in supplanting crude fuel is electricity. Even though electricity is higher in price, its national advertising has created a demand for electrically baked products.

6. A lower rate for gas will not alone create a boom for gas appliances, nor will a higher rate, coupled with advertising, be of any value; lower rates and proper advertising must travel hand-in-hand.

7. The Corner Bakery load is particularly desirable because the gas is used late at night and early in the day. Surveys indicate that at least 70% of the Corner Bakery business already obtained is an off-peak load as far as the distribution system is concerned."

"The job behind the lines," said Mr. Gallagher, "is divided into five parts:

"1. We must provide the salable product.

2. We must find out where the Corner Bakery market is located.

3. We must prepare this Corner Bakery market to accept our product, and our services.

4. We must locate the 'easiest' prospects, to build up the market as rapidly as possible.

5. We must train our salesmen for the specialized task of selling gas to the Corner Bakery."

"To summarize," said Mr. Gallagher, "three conclusions may be drawn: first, that the Corner Bakery business is just as valuable a load for gas companies as any of the others yet found.

"Secondly, that the nature of this business is such that even though it were all added upon our present loads it would necessitate very little additional capital investment. This should facilitate rate reductions.

"Thirdly, that the sale of gas to the Corner Bakery depends primarily upon the price of gas being within the competitive range of the fuels now being used. There are classes of business where gas can be sold at a price above the market, but this is not true of the Corner Bakery in any sense of the word.

"The author believes that the introduction of natural gas into the northern cities will have a beneficial influence in securing the Corner Bakery business. It is generally accepted that wholesale natural gas rates will be lower than wholesale manufactured gas rates. Therefore, we will be able to sell gas to the Corner Bakery at lower rates. The most important thing in connection with the advent of natural gas is to *get ready* to sell it to the Corner Bakery *NOW*. Natural gas at low rates to the Corner Bakery will not bring the baker clamoring at our doors. It will still have to be sold. But we have in natural gas, the first requisite, a salable product.

"Three-quarters of the work of selling gas to the Corner Bakery must be done behind the lines. And we reiterate when we have goods the buyer can use most economically, we have accomplished our first task; we have provided a salable product."

Change-over Problems

"Industrial Sales and Service Problems Encountered in Changing from Manufactured to Natural Gas," by Mr. J. H. Gumz, Pacific Gas & Electric Company, San Francisco, fully outlined the difficulties and their solution incident to such a change-over.

Mr. Gumz stated that survey work on this matter had been done by his company as far back as 1923. These surveys were for the purpose of determining the characteristics of the load likely to be met and also the volume and attractiveness of prospective business. Herewith is given a chart which is of interest. Relative to this chart Mr. Gumz remarked as follows:

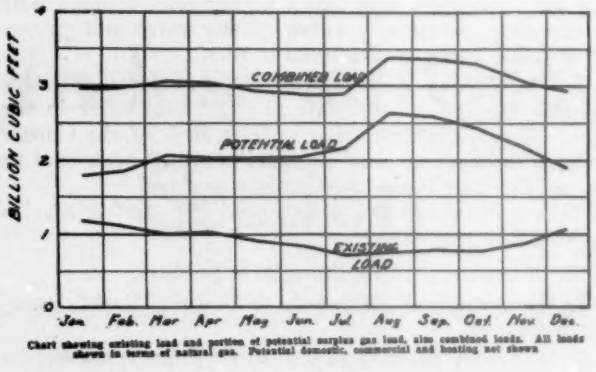


Chart showing existing load and portion of potential surplus gas load, also combined loads. All loads shown in terms of natural gas. Potential domestic, commercial and heating not shown

"The chart indicates the load which was to be expected from the conversion of fuel oil in a portion of the territory being served. It is interesting to note that the peak usage as developed by this survey falls during July, August, September and October, which, in California, are normally quite warm months. This unusual condition is the result of a tremendous fuel usage by canneries and fruit packing plants and likewise by a number of sugar beet factories. In order to make a comparison between the potential surplus or industrial load and the existing manufactured gas load, the characteristic system load curve is also shown on the chart. It will be noted that there is a very distinct tendency for the valley to be filled by the securing of this business."

The locations of prospective business were plotted on a map to aid in the proper running of pipe and the like.

The survey work showed that the bulk of fuel oil was used for firing large steam boilers. Hence, an involved study was required to develop the proper type of gas burner for these boilers as well as the working out of many other difficulties.

"It was found," said Mr. Gumz, "that in general two types of burners were used, one a Multiple jet burner and the other a Venturi mixing tube type of burner with which gas of 1½, 2 or 3 lbs. pressure could be utilized. A careful study of the 25 or 30 makes of burners on the market was undertaken and a burner of the Multiple jet type and a burner of the mixing tube type were adopted for sale."

Additional helps toward solving the boiler problem were the education of the men, employment of two experienced sales engineers from the boiler burner companies, etc.

"One customer," he said, "having twelve 600 hp. boilers which were used to provide steam to generate electricity for an interurban railroad system had a most widely fluctuating demand. The plant operated with from one to nine boilers on the line with a minimum of about 500 kw. demand to a maximum of 15,000 kw. The load would swing from 900 kw. to 6,000 kw. and back again within a period of five or six minutes. With oil burners, years of experience had enabled the boiler firemen to accurately follow the swings of the load but when gas was installed automatic regulation was demanded. The regulation and control of a gas demand, ranging from 30,000 cu.ft. to 300,000 cu.ft. per hour for from one to nine boilers, presented a most interesting problem. However, it was finally satisfactorily solved."

Mr. Gumz outlined the work and study involved in changing burner spuds and burners in general. One particular experience in this connection is given herewith:

"A plant manufacturing incandescent bulbs had several thousand burners, some of which used as little as one-half of a cubic foot of gas per hour and others used 15 or 20 cu. ft. of gas per hour. The majority of these burners were attached to automatic machines and were so delicately adjusted that a variation of an eighth of an inch in the length of the flame caused trouble. Preliminary work was undertaken several months before the arrival of natural gas and one of the tanks of gas brought from the field was taken to the plant and experimental work undertaken involving the design of new burners. This one job required the entire attention of a laboratory engineer for a period of three months and the plant management also assigned a part of their technical staff to assist in the development of the burners. As evidence that the experimental work was successful, it is interesting to know that the complete plant was changed over during the annual two weeks' vacation period and has since that time operated with the utmost satisfaction.

"As a result of the work done in the lamp plant, the laboratory staff developed a new type of Bunsen burners which were eminently satisfactory with natural gas. This burner embodies an entirely new principle upon which patents have been applied for. This development of a new Bunsen burner for laboratory use was necessary as it was found upon trial of Bunsen burners which could be used satisfactorily in other natural gas territories that the characteristics of the gas being distributed or about to be distributed were such that ordinary natural gas burners did not operate. The laboratory Bunsen burner, while being a relatively small consumer of gas in itself, represented a major problem because of the educational institutions having large laboratories. At one of the Universities, one building

alone contained over 1500 Bunsen burners, all of which required alteration to utilize natural gas. It has been necessary to change about 20,000 such burners. A similar problem to the Bunsen burner developed in that dental torches while satisfactory with manufactured gas were absolutely worthless when natural gas was used. It became necessary to develop several new types of dental torches as it was again found that natural gas dental torches which operated satisfactorily in other parts of the country could not be used with the very high B.t.u. gas being distributed. The work of changing thousands of pieces of industrial equipment brought to light many interesting things. There were many pieces that could not be made to function at all, and which eventually had to be replaced in part by different tips or other parts."

"The sales work involving the sale of gas in large blocks has, in less than a year's time, progressed to a point where 30% of the total potential market has been contracted for and interest in the activity is increasing daily," said Mr. Gumz. "At the rate the work is progressing fully 45% of the potential market for large blocks of gas will be secured by the first of January, 1931, and will represent the displacement of more than two and a half million barrels of oil annually, or over 13 billion cubic feet."

Furnace Control

Mr. L. B. Crossman, Boston Consolidated Gas Company, outlined the ingenious solution of an industrial gas problem in his paper, "Cycle Control for Heat Treating Furnaces." Below are given the high lights of this paper.

"Heat treating furnaces are ordinarily equipped with blast burners, supplied with a combustible air-gas mixture by any one of several methods of mixing. In the particular case in question, a so-called low-pressure system of mixing was employed, air being utilized at 1½ lbs. pressure, and gas at main pressure.

"Such furnaces are usually operated under a slight back pressure, which tends to prevent infiltration of air from the outside. This procedure in addition to the securing of the correct air-gas ratio makes available at all times reducing neutral or oxidizing atmospheres at the operator's will.

"In a furnace where steel is to be hardened, it is important that a reducing atmosphere be maintained, in order that oxidizing or scaling of the steel be reduced to a minimum. It is desirable to first open the door of an oven furnace, prior to lighting the furnace manually. Even if this precaution is taken, care must be exercised to prevent the emission of a puff of flame from the door opening when ignition takes place. Thus, it will be seen that some positive method of lighting had to be provided, if the furnace was to be put into operation automatically; a method that would permit of this accomplishment in a safe manner with the door of the furnace in a closed position.

"The matter of pilots was now to be considered. Atmospheric pilots were out of the question. First, because of the possibility of their smothering out in a closed furnace, and second because if sufficient excess air was provided to insure proper combustion of these pilots the leakage of air through the openings provided for the supply of this excess air would tend to make the control of the furnace atmosphere difficult when the main burners were in operation. Consequently, blast pilot burners were decided upon for use.

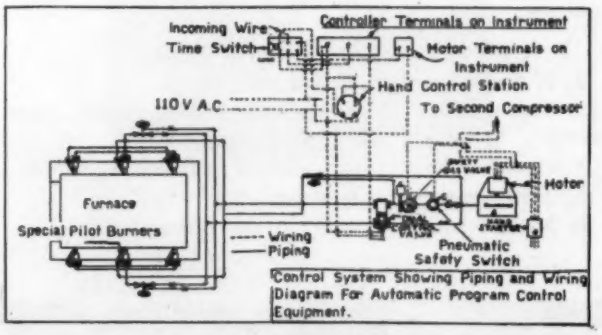
"The furnaces were constructed with individual pilots for each burner, each pilot so designed that its flame was carried diagonally across the path of each main burner flame in order that instant ignition of the main burners might be assured. Pilot burners, as well as main burners, were equipped with automatic proportioning devices. Each furnace was provided with automatic temperature control and likewise with automatic valves which would close in event of a failure in the electric or gas supply lines. A double pole, double-throw time switch completed the necessary accessory equipment."

"Assuming that the furnace is shut down, and that operating temperature is required the following morning, the procedure would be as follows:

"First start blower A.

"Next, raise weight arm on safety gas valve B, allowing it to latch in open position. (It is possible to do this only when blower is in operation, as the magnetic latching device is energized by the same current that operates the blower.)

"The gas safety switch C, is self-operating. This device is set for a minimum pressure. If the pressure drops below this setting, the switch automatically operates and closes valve B.



Control System Showing Piping and Wiring Diagram For Automatic Program Control Equipment.

"The pilots are now lighted, and the cocks on the main burner air and gas lines are opened. No air or gas is, however, supplied to the main burners at this time, as the dual control valve is closed.

"The final steps are to set time switch D and the temperature control instrument.

"At the predetermined time, the following morning, the time switch operates, thus putting into operation the automatic temperature control.

"As the furnace will be below the operating temperature, as indicated on the control instrument, the first operation of the contactor in the controller is to switch the current into the circuit which opens the dual control valve, allowing first air and then gas to reach the main burner inspirator.

"These main burners are ignited from the pilots, and remain in operation until the temperature requirements of the furnace, as determined by the setting of the controller, are satisfied. When the desired holding temperature is reached, the current is automatically switched by the control instrument to the circuit which closes the dual valve. The gas valve closes slightly ahead of the air valve, and the main burners are extinguished without noise. The pilots remain lighted. Each time the control functions throughout the day, these processes are repeated. It will be observed that the main burners are either all on or all off, and not at a maximum or minimum, as is usually the case where a

furnace is automatically controlled.

"A wide range of furnace temperature is made possible through this control, the furnaces in question operating under automatic control from 1000° F. to 1800° F. With throttling control, the temperature range would be from approximately 1400° to 1800° F.

"Furnaces may be shut down, as well as put into operation with the equipment in question, by the following procedure.

"The time switch is set for the desired closing down time, and as it operates it throws out the control instrument, and completes a circuit which closes the dual control valve. The furnace is now out of operation."

Natural Gas in the Ceramic Industry

Natural gas offers great opportunities in the manufacture of china, stoneware, sanitary ware, electrical porcelain and floor and wall tile. This aspect of industrial gas business was handled by Mr. W. M. Taylor, The Ohio Fuel Gas Company, Columbus, in his paper, "Gas as A Competitive Fuel for Large Scale Pottery Burning."

He told how the modern tunnel kiln is fast displacing the old type of kilns for this work. He stated that natural gas was best for all types of tunnel kilns for the following reasons:

"1. It produces a more uniform product.

2. It produces more first quality ware.

3. The proper kiln atmosphere is more easily maintained.

4. Accurate temperature control is relatively simple.

5. Maintenance cost is lower.

6. More frequent shutdowns are eliminated."

"In the direct fire type of kilns," said Mr. Taylor, "it is estimated that at least five per cent additional first quality ware can be produced when using natural gas instead of other fuels."

"Generally speaking when using oil or coal the refractory maintenance cost will be from 5 to 15 times greater over the same period of time than when natural gas is used. For example, in a large pottery manufacturing semi-vitreous dinner ware, two direct fire kilns, after being in continuous operation for 6½ years, were shut down in order to curtail production, not for repairs. Natural gas was used in these kilns which maintained a temperature in excess 2400 deg. F. in the fire zone. After a close inspection it was estimated that the total repairs to the kiln would be approximately $200 each. If oil or coal had been used as fuel the repairs would probably have been between $2000 and $4000 with hardly a possibility of a 6½ year period of continuous operation.

"It is an item of considerable expense to shut a kiln down, and this cost may assume great proportions in its effect throughout the production line if it is necessary at a time when production is needed. Normally, depending on conditions, it is estimated that cost resulting from shutting a kiln down and bringing it back to operation schedule will cost from $200 to $4000. Fuel requirements average about 50 M cu. ft. of natural gas per day for a period of one week to bring the kiln up to proper conditions after a shutdown."

"One reason that has kept natural gas from being used entirely in this field, where the gas is available, was its doubtful supply throughout the entire year, but within the last four or five years the possibility of a pottery being shut off, for lack of gas, has been removed and the plant operator is practically assured of a continuous supply of gas throughout the year by virtue of larger and increased facilities of the gas companies.

View of Exhibits at A. G. A. Convention

"With this objection removed, gas is rightly taking its place as the fuel in this field. At the present time it is used in over 75% of the continuous pottery kilns in the country."

Some representative average figures on burning requirements are given below:

Type Ware	*Fuel*	*Type Kiln*	*Fuel per Day*	*Fuel per Unit*
Semi-porcelain dinnerware. Bisque 2400° F.	Oil	Direct fire	900 gal. 25° Bé.	175 gal. per M doz. pcs.
Semi-porcelain dinnerware. Bisque 2400° F.	Natural Gas	Direct fire	120 M cu.ft. per day	30 M cu.ft. per M doz. pcs.
Sanitary Ware. Bisque 2400° F.	Oil	Direct fire	1350 gal. 30° Bé.	3.9 gal. per 100 lb. ware
Sanitary Ware. Bisque 2400° F.	Natural Gas	Direct fire	180 M cu.ft.	515 cu.ft. per 100 lb. ware
Sanitary Ware. Bisque 2400° F.	Natural Gas	Muffle	160 M cu.ft.	695 cu.ft. per 100 lb. ware
Sanitary Ware. Glost 2300° F.	Natural Gas	Muffle	125 M cu.ft.	390 cu.ft. per 100 lb. ware

Manufacturers Section

Excellent Address by Chairman Curfman and Live Papers Feature Meeting

THE Manufacturers' Section enjoyed an unusually successful meeting and further solidified plans looking toward facilitating the work of the various manufacturers in their all-imission of supplying the Gas Industry with the proper equipment and appliances. The nature of the papers read as well as Chairman Curfman's able address indicated that this branch of the Association is fully awake as to the changing trends which so materially affect the goods they produce.

Mr. Curfman called attention to the fact that it now "appears to be necessary to create, within the Manufacturers' Section, two distinct departments to be classified as Divisions; one of manufacturers of appliances, and the other of all other manufacturer members, and it is recommended that each division should elect its own presiding officer, who will be a vice-chairman of the Section, and the divisions to organize as they may find it desirable to meet their own particular needs. This method of organization was designed so that the divisions can be arranged without conflict with the by-laws of our Association.

"It seems advisable for the appliance division to meet, perhaps, several times a year, this to be done at its own discretion. Probably it would not be necessary for the other division to meet so frequently."

He also referred to the necessity for the manufacturers having readily available authoritative business statistical information. "As a further indication of the value of pertinent data on our business," said Mr. Curfman, "the Statistical Department has listed for me some typical inquiries and requests received from manufacturers and their advertising agents during the year 1930. I shall read only a few as follows:

"30 companies, requested data on the gas industry, including list of gas companies statistics, communities supplied with gas, rates & territories served.

E. S. Dickey, Chairman-elect, Manufacturers' Section

8 companies, requested information on the number of domestic meters, covering both manufactured and natural gas.

7 companies, requested data on natural gas developments.

5 companies, requested data on all gas customers by states.

4 companies, requested information on the territory in which natural gas is available.

3 companies, requested data on conversion gas burners, sales of domestic gas-fired boilers and furnaces.

3 companies, requested the number of gas ranges in use.

3 companies, requested data on the average operating cost per month of cooking with manufactured and natural gas.

3 companies, requested data on communities not supplied with gas."

He stated that the preliminary steps have been taken toward organizing such statistical service.

Next, the Chairman outlined the investigation of the need for and plans for setting on foot a traffic bureau and a credit bureau. He also touched upon the question of trade relations with the manufacturers' customers and certain trade abuses and unethical practices the manufacturers frequently suffer. Relative to this matter he said: "any group representing any line of business among our members, that may have a common interest, can organize among themselves a division and elect their own chairman and collaborate on any subject they wish to bring before the Association, or keep their purpose of meeting confined to themselves as they

The centralized control of operation of our public utilities and the changes in our economic living conditions have affected our commercial and merchandising problems. In addition, the enormous expansion of natural gas distribution and the satisfactory utilization of liquified petroleum gases have opened new territories and increased our potential markets, requiring greater united effort to keep in step with the changing conditions and new opportunities.—F. G. Curfman.

may consider advisable. Your chairman will gladly assist any group in organizing any of the divisional activities that may be called to his attention."

In concluding his remarks Mr. Curfman complimented the American Gas Association and Mr. Berghorn, Secretary of the Manufacturers' Section, on their fine co-operation. He also suggested that "possibly some of the manufacturers could benefit from the sales courses made available by the Association, the advertising services, the many various reports published by the several sections and other activities of the Association dedicated to the advancement of our industry."

Butane Appliance Possibilities

The paper, "New Markets for Appliances and Equipment Resulting from the Use of Butane and Propane," by Mr. R. W. Thomas, Vice-President and General Manager, Philfuels Company, Detroit, Michigan, opened a wide vista as far as the increased sales of gas appliances is concerned. He showed by cold calculations that in the case of small towns where gas is not now available there is a probable market for about $67,500,000 worth of appliances; this where it is not now economical to procure gas from the nearest large town but where butane plants can be profitably operated. In the case of pipe, meters, regulators, and gas plant apparatus for these same towns, allowing $100 per customer, it was shown that at least $45,000,000 would have to be spent.

For very small communities and rural districts that could not support the small butane plants Mr. Thomas said that bottled gas would fit in. In this field he assumes a very small minimum of 1,300,000 users who would buy at least $100 worth of appliances each. This would then total to a sum of $130,000,000 for appliances and about $117,000,000 to be spent in physical investment to take care of these remotely located customers. As to the allotment of this latter figure Mr. Thomas stated that, "a large part of this will go to cylinder manufacturers for the bottled gas containers. However the producers of regulators, of valves and fittings, of steel or wrought iron pipe, pipe fittings, tanks, tank cars, high pressure holders and miscellaneous devices will all have a substantial share in this enormous expenditure. The automotive industry will sell a large number of trucks, salesmen's cars and other vehicles, for the bottled gas industry is essentially an industry on wheels. The labor necessary to man this industry and to provide a high grade gas service to users of bottled gas will run into large figures."

As to the appliance replacement market he brought out that approximately $30,000,000 would be expended annually.

Concerning the growth in butane plants Mr. Thomas said that there were now more than thirty butane plants in operation east of the Rocky Mountains and ten or more under construction and in operation on the Pacific Coast. Two years ago there were only two in the entire country. He was of the opinion that the bottled gas industry would proceed more slowly due to the higher cost of the gas service and the scattered territory to be cultivated. "It is thought," said Mr. Thomas, "by certain men of far-reaching vision that the gas industry and the appliance and equipment manufacturers have not given these bottled gas market possibilities the study which they deserve and have failed up to date to appreciate the enormous gas load that lies at their very door." He further was of the opinion that bottled gas "is a primary retardent of electric cooking at the present time."

Mr. Thomas concedes that this appliance market will not be obtained without hard work, since the prospects are rather set in their ways. They like their old coal and wood stoves, particularly for space heating. In this connection he thought they could be gradually weaned away by means of an easy transition through a separate kitchen heater and gas range and finally to the gas range alone.

He recommended keeping the selling price of the appliances very low consistent with safety and other necessary factors.

From the standpoint of the use of these two forms of gaseous energy in industrial operations he pointed out the field for industrial furnaces, burners, proportioning devices, regulators, thermostatic controls, etc.

In lieu of complete findings on the type of burners to be used with these gases, Mr. Thomas stated that there was available, however, some definite information. His observations in this connection follow:

"In general the appliances should have some 50 to 65% of the theoretical air supplied as primary air, and should have air-gas exit ports with about double the area used on manufactured gas appliances, to compensate for the lower rate of flame travel. If this is not done, the B. t. u. input must be greatly restricted or the flame will blow or float from the burners.

"Owing to the low rate of flame propagation of propane, butane and pentane, flash-back difficulties even at very low turn-downs offer no problem. Ports as large as No. 30 drill size can be used on top burners, although the maximum size recommended under ordinary circumstances, is No. 32. For oven burners where the temperature conditions are more severe, it is ordinarily advisable not to go larger than a No. 36 port, although No. 34 and No. 32 ports, have, and are being successfully used. The thickness of the metal through which the ports are drilled has some influence on flash-back difficulties and the port channels should not be less than 3/16" for the larger drill size ports.

"Laboratory tests and actual field experience with both propane and butane-air appliances indicate that the

The continual pressure on the part of the manufacturer to push the high priced or luxury lines is in effect tending to "kill the goose that lays the golden eggs" and this is particularly true of the more conservative residents in the suburbs, the small towns and the rural districts.—R. W. Thomas.

following table should be closely adhered to in appliance design:

Port Size	*Maximum Permissible B. t. u. /hr/ port* *For Top Burners*	*For Oven Burners*
32	174	205
34	160	193
36	147	180
38	133	168
40	125	157
42	113	140
44	96	125

"The distinction between top burners and oven burners is made because of the possible impingement of the flame on a cold surface in the case of top burners. Water heater burners are ordinarily designed with the higher port rating used on oven burners.

"The characteristics of the liquefied gases, particularly undiluted propane vapor, are such that some special construction is advisable. White or red lead is more or less soluble in the liquefied gases and all threaded joints on the appliances should therefore be put together with shellac, litharge and glycerin or equivalent insoluble compounds.

"The same solubility effect is felt on the stop cock lubricants, therefore the most successful lubricants have been those containing a large portion of graphite, and some of the less soluble animal and vegetable oils. Cock lubrication difficulties have been aggravated in the past few years by concealed manifold stoves, where the cocks are subjected to high temperatures from radiated or conducted heat and from super-heating of the inlet gas from poor location of the gas piping and manifold. Concealed manifold stoves should have ample ventilation around the manifolds and cocks and the lubricants should be very carefully selected both for insolubility in liquefied gas vapors and for resistance to high temperatures.

"On propane burning appliances a comparatively high pressure (about 11" of water) is carried in order to inspirate sufficient primary air to give proper combustion. This higher pressure aggravates stop cock and pipe thread leakage difficulties, and is also a factor in the design of thermostats, safety pilot shut-off valves, etc. The air inspirating efficiency of the venturi tubes of propane appliances must be comparatively high in order to avoid a yellow flame condition. On the other hand, butane air gas already has so much air present, that the amount of additional primary air inspirated must be very low, therefore the air shutters must be either very tight fitting or some device used to reduce the efficiency of the inspirator. Several such devices have proven very satisfactory and are commercially available to all equipment manufacturers.

"Natural gas, butane-air gas and pentane-air gas mixtures are ordinarily sold at prices which are comparable with ordinary manufactured gas prices, therefore no strenuous attempts to increase the appliance efficiency need be made. Consequently the spacing from top of burner to top of grate may be standard 1⅝" although it has been found perfectly safe to go to a closer spacing 1¼" with the AGA minimum input. Propane, as served by bottled gas systems is ordinarily quite expensive and the utmost in efficiency should be obtained to render the cost of the gas service as low as possible to the customer. Increased efficiency of heat application is comparatively simple and the standard practice is to space the burners from ⅝" to ⅞" from the top of the grate and to correspondingly decrease the B. t. u input per burner, so that the same amount of work can be done with a considerably smaller calorific value input. Top burner efficiency on propane stoves ordinarily exceeds 50% on the AGA standard test. Propane stoves also should be built with fixed rather than adjustable spuds, for a high B. t. u. input with a close burner spacing will not only prove costly to the user but may cause appreciable carbon monoxide formation. The higher propane pressure will cause leakage difficulties through the threads of adjustable spuds. The adjustable spuds are not as efficient from the standpoint of air inspiration as the case with the fixed orifice, therefore there is some question as to primary air supply when adjustable spuds are used on propane appliances.

"Owing to the density of both propane and butane and their mixtures with air, and to their low rate of flame propagation, special precautions should be taken in the design of appliances to provide for easy lighting, either by hand or from pilot lights, and for insurance of proper travel of flame from one port to another, particularly on oven burners. The maximum allowable center to center port spacing is in practically all cases ⅜", however, the 5/16" spacing is preferable for both top and oven burners. Spacing as low as ¼" may be used; however merging of the individual cones and partial smothering may result from extremely close spacing.

"Butane-air burning appliances should fully comply with the same minimum calorific input limits which are observed on manufactured and natural gas appliances, in order to satisfy the users as to the rapidity of heating, and to comply with the desires of the utilities which usually favor large B. t. u. inputs. Correct spud size alone is not sufficient—the entire burner, and particularly the ports, must be adapted to meet the characteristics of this gas. Design of butane air appliances should not be confused with that of propane burners with their usually lower heat inputs and higher efficiencies."

"To sum the matter up, it is recommended that natural gas, butane-air gas and pentane-air gas appliances be standardized and built in an identical manner with the possible exception of spud sizes. However, the use of adjustable spuds and identical burner spacings will make appliances for these various gases completely uniform.

"Propane appliances may have the same burner drillings as the others just mentioned; however, the use of fixed spuds and the closer burner spacing on top burners will make these appliances always more or less special.

"Consideration as to interchangeability of appliances for various gases should be given. It is possible that a definite standard distance from the cooking top to the center line of the spuds on all appliances would be a step in the right direction; it would then be possible merely to interchange top burners between manufactured gas, propane and the natural-butane-pentane group of appliances if conversion from one gas to another were desired. Oven burners can be successfully designed to handle any of the manufactured gases or the paraffin hydrocarbon gases without changes in port drilling. However, these burners will naturally have some modification from the regular manufactured gas burners of today."

Commercial Section

Sales Analysis and Surveys, Househeating and Home Service Receive Attention at Commercial Gatherings

E. R. Acker, Chairman-elect, Commercial Section

CHAIRMAN Whitwell presided at a very well rounded two day session of the Commercial Section, as is evidenced by the high quality of the papers presented. A digest of these papers serves to convince one that the phases dealt with must be included with the most important in this line of gas company endeavor.

Engineering and Selling

The paper by Mr. Louis Stein, Northern States Power Company, Minneapolis, "Applying Engineering Analyses to the Sales Problem," was of especial interest due to the fact that in the recent past several prominent gas engineers have gone over into the selling end of the business.

Mr. Stein stated that gas companies have been spending too much time endeavoring to pare off a few mills from operating costs at the expense of ignoring and losing the sales dollars "passing behind our backs."

Relative to combination companies he said that the electric end should not be pushed to the detriment of the gas department.

Referring to the matter of the kind of salesmen to employ and their rate of compensation he said:

"You are paying for mediocrity and getting just that. The manufacturers are paying large dividends to their stockholders almost in direct proportion to the size of compensation checks they pay their salesmen. They are doing the things you are inherently better equipped to do and making plenty out of it while you stand around with your fingers crossed; afraid to follow Caesar and your load remains as mediocre as the so-called salesmen you engage."

Mr. Stein did not subscribe to the theory that we are losing the domestic cooking load as a general proposition. He substantiated his contention by way of the increasing number of home owners throughout the country, and "mathematical increases in home ownership can only mean increases in the amount of home prepared foods."

"In discussing the so-called loss of the domestic cooking load," said Mr. Stein, "probably a distinction should be drawn between cooking and baking, inasmuch, as there probably has been a greater tendency to buy bread and pastries than there has been to avoid the matter of preparing other home cooked foods. It would, therefore, seem that if the domestic load is waning at all, it is the baking portion of it which has been affected, in which case, it has not been lost to the gas manufacturers. By and large, the bakeries are being operated on utility products, either coke, gas or electricity."

He answered the question as to a workable arrangement for retaining and increasing the use of gas for cooking by stating that advertising and intelligent selling would accomplish this end.

Mr. Stein advised that we must popularize the kitchen just as the bath room has been made more attractive by way of decoration and the like, to mention nothing of the work that has been done to rejuvenate the cellar due to automatic heating.

Relative to advertising he mentioned the necessity for a tie-in with the radio.

The encouraging feature of home service, he said, is that it "is rapidly emerging from the class of recipe mongers to the state which is more in keeping with its intended character."

Touching on the sale of refrigerators in combination companies he said the gas unit should not be pushed into the background, thereby causing the prospect to wonder why all the national advertising on this type. "Why permit the customer to wonder why you apparently do not believe in the things said by the public press and in paid advertising about modern utility appliances," said Mr. Stein.

As to househeating he emphasized that this was no longer in the Rolls Royce category. He advised that proper househeating rates be established at once, rather than tackling the problem piecemeal.

Stifling of the gas utility that the electric may accomplish certain specific objectives impresses one with the idea that somebody is thinking exclusively of kilowatt hours and possibly regards the gas properties as something the "cat dragged in."—Louis Stein.

In conclusion he said: "Finally, this speaker asks permission as one of the 'intelligently ignorant' to emphasize the necessity for doing that which we propose to do *immediately.* Procrastination will prove to be a thief of profits as well as of time. Coordination of all departments toward this end is vital. A perfect liaison will have to be substituted where it is absent. Departmental autocracy will have to be eliminated where, when and if it exists. Managers can be made to fully realize their responsibility toward this end, and it seems axiomatic that such men who can properly interpret their duties and functions as load builders and salesmen, will have no cause to be concerned about the high regard and respect which their companies will command in the communities which they serve."

Excellent Conversion Burner Paper

One of the best expositions of the subject of conversion househeating burners was given by Mr. Henry O. Loebell, Combustion Utilities Corporation, in his paper, "The Conversion Burner for House Heating — An Economic and Sales Analysis."

He said that there was neither need for prejudice against them nor over-enthusiasm for them "as the only means for progress." In speaking of househeating as a selling problem Mr. Loebell said:

"It is an easy matter to sell 100 or 200 house heating jobs in a city with 50,000 meters, but it is another matter where you try to sell house heating to 5 or 10% of your connected meters per year. This selling problem is a particularly serious one when we consider the fact that there are many other things of established value to the home owner which are bidding for his money, namely, the automobile, the radio, the washing machine, the vacuum cleaner, the furniture man, the stock salesman, etc. To make 2,000 or 5,000 home owners in a community of 50,000 connected meters each year sufficiently appreciate the advantages of gas house heating so that they will buy this equipment instead of a new automobile, or a new radio, is a large assignment and one to which we must give the greatest consideration if we are to have any hope of fulfilling such quota."

"It seems to me," continued Mr. Loebell, "that in arriving at a decision as to the type of equipment which would be most conducive to obtaining the house heating load with the greatest possible rapidity, in a practical way, the four following cardinal principles should be considered:

"1. What type of equipment will involve the least commitment, the least hazard, the least of the unknown on the part of the customer?

2. What is the lowest cost equipment that will render a distinct and satisfactory service?

3. Which type of equipment is the easiest to merchandise (including selling, installing and servicing)?

4. What type of equipment will give the customer the greatest value per dollar invested?"

With reference to the first item he brought out that a customer might have in mind buying a gas-fired furnace but wonders whether the price of gas will in the future be in line with the cost of other fuels. He stated that many men will hesitate to put out money for the furnace under these conditions and hence will more readily consider buying the conversion job, so that in case he decides to change back to the original fuel for some reason or other he will feel that he is economically free to do so.

"The second item of sales resistance," said Mr. Loebell, "involves the item of cost. In comparing the gas-fired furnace equipment with the better type of conversion burner on the market, we have a relative price situation of approximately $175 for the conversion burner completely installed, in comparison with a price for the warm air gas-fired furnace of $400 and a gas-fired boiler of $600 or $700. Now this is certainly a big difference in cost and it must be evident to all of us that where all other industries such as an automobile, radio, etc., are bidding for the customer's dollar, we have a much greater chance of success where we offer him automatic gas house heating with a conversion burner at a much reduced initial cost."

Touching upon the third item he said that in "considering equipment which can be sold on a large-scale basis, the problem of selecting something which can be readily merchandised is of the greatest importance." He continued by saying that such a scheme involves the proper crew of men to work efficiently and systematically. Such sort of work has already been done so that we have a body of gas men working for the organization. With the gas-fired furnace he stated that quite a little dependence had to be put in outside agencies to help out and hence the problem becomes more difficult than in the case with the sale of the conversion burner.

Concerning the fourth element, Mr. Loebell said that this point had involved considerable discussion on the part of gas men. However, he said that both types give the same service essentially and that therefore the customer got the greatest value for the dollar invested from the conversion burner.

Touching upon the relative operating costs he said that "the experience in the field of conversion equipment during the last two or three years indicates definitely that in practically all territories, particularly where natural gas is available, this item of cost of operation is not an important factor and does not have an important bearing on the type of equipment which should be used to sell large quantities of gas for house heating."

For those who would challenge this statement he offers the following:

"If the average home owner would spend the same amount of money for a conversion burner and the insulation of his home that he would spend for the cost of a gas-fired furnace, the cost of operation of the conversion burner would be considerably less than the gas-fired equipment although the total cost of the investment on the part of the home owner is no greater."

Mr. Loebell further expounded on this phase by discussing the five important factors of efficiency in any furnace, namely:

"1. Adequate surface for heat absorption.

2. Passages for gases so constructed that in turn contact between the hot gases and the boiler or heating surface is maintained.

3. Volume and velocities of hot gases maintained that

We have before us at this time a great opportunity of expanding our business in the house heating field and the experience of the last few years has definitely indicated that the best way of doing this is by selling one of the better types of conversion burner equipment in addition to gas-fired furnaces.—Henry O. Loebell.

will give the lowest flue gas temperature consistent with surface.

4. The proper ratio of gas surface and air properly mixed and properly distributed.

5. All factors of circulation in the furnace or boiler used for heating, water, steam or air," and showed that there is little difference in a properly designed conversion burner and a gas-fired furnace in meeting these stipulations. In view of the foregoing he said that what is holding back the sale of conversion jobs is that we are not applying our engineering knowledge to the situation.

Speaking of the field for the gas-fired unit he brought out that this equipment should be sold where new homes are being built, and to prospects who are well educated to the advantages of gas or where the problem of economics is not involved.

Of course all of Mr. Loebell's contentions are based on the assumption that the proper type of conversion burner is being considered.

Surveying for Natural Gas Customers

In his paper, "Developing Natural Gas Sales," Mr. R. E. Fisher, Pacific Gas & Electric Company, San Francisco, told how his company made a potential load survey before natural gas came into his company's territory. In this connection he stated that much oil was being used and on contracts that ran for several years and included the stipulation that oil only was to be used. This foretold a keen competition.

In preparing for the advent of natural gas over 1,000 men were specially trained. Meanwhile large tanks of natural gas were shipped to the laboratory and tests run on all types of appliances. Then the program was made to include a call on all customers to make the necessary adjustments on their appliances. Instruction was also furnished by way of newspaper ads and the dealers were coached so that they could handle their own service calls, where such dealers usually maintained such a service department. Special instruction letters were also sent to the customers.

One item of importance in connection with the survey work was that it gave the company a complete list of the number and kinds of appliances in service and thereby was of value in formulating sales plans.

The Pacific Gas and Electric Company, which enjoys good dealer cooperation, capitalized on this situation and held a series of meetings with the dealers, thereby helping out considerably. "Our cooperation with heating dealers," said Mr. Fisher, "resulted in their selling natural gas to over 80% of their prospects whereas previously when only manufactured gas had been available these heating dealers had been selling furnaces using competing fuels in a majority of cases."

Much work was done along the conversion burner line for househeating. A proper type of burner was adopted and direct mail literature was used to advise the public as to the advantages of gas househeating. Billboard advertising was also employed. As to terms of sale Mr. Fisher said the following:

"With the exception of San Jose all of our territories including San Francisco and Oakland received natural gas during the summer of 1930. Nevertheless, during the spring and summer of 1930 it had been determined to sell as many conversion burners as possible and of course it is difficult to sell heating during the spring and summer months. This was offset by a special sales offer of only $10.00 down and the balance dated October 1 when the monthly payments of $5.00 a month would start. The total selling price was $110.00 for a conversion burner installed complete with thermostat, regardless of the size of the furnace. This was considered one of our most successful sales features.

"As of September 1, 1930 over 6,000 domestic conversion burners have been sold or nearly 15% of the total potential market and the activity was actually started March 1."

In conclusion he made the following remarks:

"In developing natural gas sales it was found highly advantageous to have some definite point where all types of industrial heating equipment could be exhibited and demonstrated. A special exhibit for educational purposes only was arranged for and not only were prospects brought there on individual occasions but many of the important group meetings with engineers and various organizations were conducted at the natural gas exhibit.

"The sale of natural gas in our territory is by no means a completed job as yet although a favorable public acceptance has been created for natural gas. In many districts, coal dealers, for example, have organized and attempted destructive advertising and publicity. The most important consideration in our natural gas sales program, however, has been to tell the public, the dealers and even our competitors the true facts about natural gas, believing that our constructive endeavors along this line will win out in the long run."

Prezzano on Home Service

Home Service was handled by Mr. E. P. Prezzano, Vice-Pres., Westchester Lighting Co., Mt. Vernon, N. Y. in the paper, "Home Service — Its Place in the Gas Industry." He traced the growth in Home Service work and stated that such efforts were first inaugurated in New York about 25 years ago.

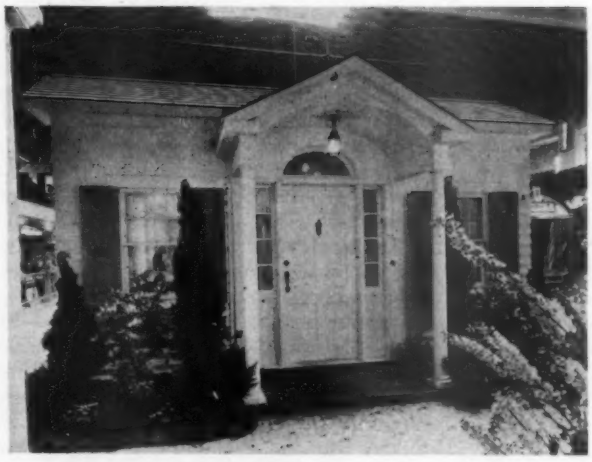
Commenting on the work done last year by Home Service throughout the country, Mr. Prezzano gave the following impressive figures:

"From a return of 75 questionnaires covering only 30% of the total number of companies maintaining home service departments in the A.G.A. but representing the majority of the larger companies, it was possible to obtain a fairly complete cross section of Home Service activities and results during the past year.

"Approximately 3,000 lectures were given to outside groups and 195,000 people were reached in that manner; 177,000 calls were made in the homes covering complaints, follow-up calls; inquiries were received from 68,000 people. The total number of people attending cooking classes was 521,000 and 6,900,000 recipes were distributed.

"In all a grand total of 24,058,000 women were

If you are working on ideas and not on direct sales, urge those ideas towards a tangible return. Stimulate gas consumption, raise the domestic load through simple, sure, legitimate means and Home Service need not question its place in the gas industry.—E. P. Prezzano.



How Westchester Lighting Company Features Home Service by way of a Booth at a local Exhibit

reached by Home Service workers from 75 companies alone."

He then went on to narrate how much good the Home Service worker can do the company as an "ambassador of good-will." He said, "The object of Home Service is not to teach cooking—washing or ironing—it is to stimulate the use of gas by showing our customers the convenience and economy of using gas for this purpose. Behind every pan of biscuits baked is a desire toward the improvement of the company's load."

As to whether it is possible to definitely check-up on the work done by Home Service Mr. Prezzano stated that, "To my mind it is possible to trace tangible sales to Home Service if a check-up is made. One director, to my knowledge, created prospects from which the sale of six refrigerators was made. This was within a short period of time—I do not recall how long."

He emphasized that there was no question as to the need for Home Service, concluding with the following advice:

"And to executives of gas companies who have not as yet organized home service units, my advice is—get on the band wagon at once. You'll never regret it. To those who have already organized home service units let me urge you to give it your fullest support and co-operation. Don't count the pennies too carefully—don't expect the cash register to jingle all the time—remember the many intangible benefits which Home Service brings — remember the many intangible sides to our business and in that lies our real opportunity to make friends—through courtesy, and service well performed.

"Home Service has made a place for itself in the gas industry; it is here to stay."

Publicity and Advertising Section

Significant Papers and Addresses Pave Way for Increased Business

Donald M. Mackie, Chairman-elect, Publicity and Advertising Section

WHAT with the really fine work being done by many gas companies in producing advertising and publicity that is both artistic and informative it was to be expected that such meritorious efforts would be reflected in the quality of the papers read before this section. Accordingly, those in attendance at the meeting of the Publicity and Advertising Section were regaled with information and advice that can well be applied in their particular companies' activities in this direction.

In his address Chairman James M. Bennett acknowledged the valuable aid rendered by Mr. Keith Clevenger, Director of Publicity and Advertising, and Mr. A. B. Tunis, Secretary of the Publicity and Advertising Section. Referring to the work of the Publicity and Advertising Section as a whole, he was of the opinion that much lasting good had been accomplished during the past year.

Mr. Bennett felt that the closer cooperation between the Commercial and the P and A Sections as well as the General Educational Committee were outstanding accomplishments. Relative to some of the results attained he stated that there were now 180 subscribers

With smaller spending margins on the part of the average citizen, the advertiser is in even keener competition with others for his part of that spending margin. Merely to keep in the race means continuous advertising—if, indeed, it does not require the courage of spending even more money for advertising in hard times when the picking is difficult than in easy times when business comes readily—James E. Bennett.

to the Art and Copy Service and 85 to the Household Information Service. He also called attention to the way Cleanliness Institute has been cooperated with.

As regards the A. G. A. Monthly in its new dress and make-up he said "it is today a magazine of which any industry might well be proud."

Mr. Bennett cautioned against undue cutting down in appropriations for advertising on the part of gas companies.

"That this is, in the long run, a short-sighted policy is amply evidenced by the experience of a number of large national advertisers during the last depression period in 1920," said Mr. Bennett, "Charts showing their relative advertising expenditures and sales during 1920 and the five years following, indicated that those national advertisers who steadily but conservatively increased their advertising during 1920 and the years following were rewarded with a consistent and proportionate increase in sales. On the other hand, those advertisers who, because of depression and hard-times talk in 1920, decreased their advertising appropriations showed almost an exactly proportionate decrease in sales during 1920 and the next five years."

Preparing for Advent of Natural Gas

Mr. Frank R. Jamison, Director of Publicity, Public Service Company of Colorado, Denver, in his paper, "How Change-Over from Manufactured to Natural Gas has affected Company Advertising and Publicity," gave a spirited narrative of how Denver paved the way for natural gas, particularly as regards the publicity aspect.

He briefly traced the discovery of natural gas in the Amarillo field and the preliminary despair of the local gas men as to what disposition to make of this surplus of fuel. Then he told how it was decided to transport natural gas from the field to Denver and how the employees and public were prepared for its delivery in Denver homes and factories by way of an educational campaign.

"In addition to preparing the minds of the customer," said Mr. Jamison, "company employees must be trained. Accordingly, a school of experience and practice was established. Gas was manufactured equal in caloric value to the Natural Gas and this was used in the school of orifice adjustment for experimental purposes months prior to the arrival of the new fuel. Furnaces were "changed over" from artificial to natural gas in this school of instruction as were all other gas burning appliances, done in every particular under the careful supervision of an experienced gas engineer."

"It was necessary to acquaint the public with the fact that the new fuel contained two and one-half times manufactured gas B.T.U. content—without creating alarm. Hence, there was a building-up process, through newspapers—that visualized the gigantic enterprise enroute to Denver, ditchers doing the work of three hundred men; spanning chasms with natural gas conduits; welding and cutting, by electricity, the massive 20 and 22-inch pipes. Much of this constituted *news* and found its place in reader sections of the local press. Particularly featured were those stories dealing with Henry L. Doherty's part in the enterprise—his Denver background—his dream of Denver as a "smokeless city"—and how natural gas fuel would be an immense step toward fulfillment of that dream. Special points were stressed in display advertisements: "Natural Gas On Its Way to Denver"—when the supply was turned on at Amarillo; a map of the city showing the nine natural gas districts; rotogravure pictures in both Sunday newspapers; a series of display ads when Natural Gas was introduced to each of the nine districts, beginning June 22 and ending July 31, 1928, when the last district was hooked up. An advertisement—which, incidentally, rated another news story—of prime importance was printed, placing customers on the lookout for "red cards" mailed just before natural gas was turned into sectional distribution systems.

"I think these red cards deserve special mention. On one side, in script, was: "VERY IMPORTANT." Below, in commanding type: "INSTRUCTIONS TO USERS OF NATURAL GAS FROM PUBLIC SERVICE COMPANY OF COLORADO." On the opposite side appeared: "NATURAL GAS WILL REACH YOUR HOME ON OR ABOUT JULY 18" (or whatever the date might be) and instructions as to how the gas range might be used safely—top burners only—until service men arrived to make necessary adjustment of appliances. Added information acquainted customers with the army of trained experts, working at high speed to service the city promptly. At the bottom of the card in large letters was: "PLEASE POST IN A CONSPICUOUS PLACE UNTIL OUR SERVICE MAN CALLS."

"Housewives read instructions carefully, again and again. The word "danger" did not appear; but underscored words: "WE SUGGEST YOU DO NOT USE YOUR GAS WATER HEATER, YOUR GAS ROOM OR FIREPLACE HEATERS OR OVEN ON YOUR GAS RANGE UNTIL ADJUSTMENTS HAVE BEEN MADE" inscribed intelligent caution.

"In passing it should be mentioned that the actual turning on of natural gas at the city gates was featured as a civic occasion with Mayor B. F. Stapleton and other municipal executives operating the gates. Press pictures of the event—in which Company officials and spectators were photographed with civic dignitaries, provided admirable publicity such as could not be sought in advertising space.

"This was a climax to the long campaign of prepara-

At least we may look for one result from the present situation, and that is, that it has tended to kill off a deluge of smart-aleck advertising copy and layout and is compelling advertising to go back to the fundamentals of salesmanship. If we do no more than to put salesmanship in advertising in a more effective degree, much is accomplished.—Donald M. Mackie.

tion that included a broadside, delivered to all customers, concerning: "Denver's New Natural Gas—The Ideal Heat For Homes;" banners on Public Service Company of Colorado trucks; street car cards: "No Furnace Worries With Natural Gas" and "Automatic Heat In Your Home With Natural Gas;" billboards with: "Gas Heat Can't Be Beat," "No Smoke Nuisance;" and window displays featuring a rainbow of ACHIEVEMENT—until, with newspaper publicity, the innovation, for which the city was prepared with a twenty-year franchise, became a subject of domestic, social and business conversation.

LIKE A GIANT THERMOS BOTTLE
THIS AUTOMATIC GAS WATER HEATER IS INSULATED TO HOLD HEAT
IT GIVES YOU 24 HOUR HOT WATER SERVICE economically

Suggested Display by American Gas Association

"A school was established at our Service Station in West Denver. Three hundred and fifty men were trained to adjust appliances and, when fully educated to the work, were divided into crews comprising a foreman and twelve assistants. As each of the nine districts was introduced to natural gas, this battalion of experts—one crew to each of twenty precincts in each district—went into action, and, within about three days, all appliances in each successive district were adjusted to natural gas—accomplished with a minimum of inconvenience to customers.

"Meanwhile, New Business representatives had been contacting the public, further educating customers in the efficiency of the new fuel, its cleanliness and convenience. It was urged by these inspired salesmen—inspired by the knowledge that the Denver gas load would automatically be reduced 250 per cent with the advent of Texas fuel, and that this slack must be taken up by increased patronage—that customers could now use far more gas without adding to the fuel bill; that gas house heating had now come within the reach of all—under long period terms of payment for equipment.

"Nor would the Denver natural gas panorama—as it appeared during the first half of 1928—be complete without the highly important background of motion pictures which contributed strongly to Denver's "gas alertness." This 2,100 feet of film, into which all possible action was crowded, was a vivid portraiture of the natural gas enterprise from its inception in the discovery well at Amarillo to its arrival at Denver's outskirts. Entitled "Moving Nature's Fuel Bin" the picture appeared first in one of Denver's largest movie houses which enjoyed S. R. O. patronage throughout an entire week. Then the film was shown to various civic, service, church and school groups, finally going "on tour" to the western coast. A conservative estimate indicates that more than half of Denver saw the picture—and the rest heard about it. Photographed in natural colors, the two reels contrast the Amarillo field before and after drilling; the men who conceived the Amarillo-Denver project; airplane views of construction work; methods of laying pipe through all types of country; a comparative chart showing reserve supply of gas; a view of one well which, alone, is capable of supplying over 80 million cubic feet of natural gas a day—more than twice the anticipated requirements of Denver during the winter of 1931."

Good Advice from Mackie

"Stay in the Gas Business," by Mr. Donald M. Mackie, Commonwealth and Southern Corporation, Jackson, Mich., brought out that it is time that we dispense with the theoretical and get down to practical procedure in our advertising. Mr. Mackie advised that we bear in mind what we are selling. In this regard he said: "We are selling fuel for cooking, for house heating, for industrial and commercial processes, and by-products, such as coke—and we are selling to a market that brackets 80% to 90% of the homes in the community. In determining the copy approach to such a market, we might do well to look at some of the figures now being released by the census bureau indicating many a community where an average income of $1400 per worker is the rule. This means competition with a great many other commodities and services. Those who so glibly would make the public believe that there is no competition in the gas industry should take a salesman's kit and pound the pavements for a few months. We know well enough that we are competing with other forms of fuel, but more than that, we are competing with desires for other things, which sometimes make the necessities suffer. And we must remember, too, that the more convenient we make it to utilize gas service, by the same token it is often as convenient to shut it off."

He suggested that the matter of direct mail is worth studying. "In a consideration of advertising tie-ups," he said, "it is my experience we can do very well by the business to give increased attention to the practicalities of direct mail. It is not primarily a question of what can you do with direct mail, but rather what do you want to do with your advertising. If you will look at your advertising and sales promotional requirements in the light of what you would like to be able to do, you will find that for specific activities direct mail is becoming more and more active as a business building tool. In some cases, it is a supplementary part of a campaign which may involve newspapers and other recognized media. In other cases, it works alone as a part of the personal solicitation operation. In this day of competition for attention by all advertisers, well applied direct mail contacts of a public utility get by where others don't.

"In the specialized field of gas house heating (I refer primarily to the territories in what might be termed the northern area using principally manufactured gas), experience indicates that taking cost considerations into

account in the average community under 100,000 population mail contact direct to the class of prospects available secures more results at lower cost than any general newspaper blanketing. In such situations, we have found results in our first year of active advertising promotion from a series of four mailing pieces of high quality spread through the year so that one reached the prospect at the peak of the heating season, two at the close of the heating season when the time was right for a change of installation and the fourth at the close of summer to again take advantage of time for making necessary changes in heating plants."

Mr. Mackie advocated the use of the newspaper in furthering the sale of coke, stating the following:

"When it comes to the sale of coke, it is our experience that newspaper advertising is the basic requirement designed to meet two situations: First, the regular advertising through the fall and winter; Second, the campaign on the fill-your-bin plan during the summer. This newspaper advertising naturally covers the community as a whole. However, as a fuel dealer you have on your books a regular clientele of coke users, and to these direct mail again proves effective. This is particularly so when you utilize multigraphed letters sent to such customers over the signature of the local manager, calling attention to the particular campaign, such as the summer price plan which may be in effect at the time. As a good advertising tie-up, I would suggest that you take the figures for the coke tonnage sold in a given community, and on the basis of 30c a ton for advertising, see what amount of promotional material can be worked out with that sum as a basis for your budget."

In conclusion he said: "There is never a time when your good will efforts can rest—whether it be service, employee attitude or educational advertising. Nor is it safe to parallel self-satisfaction with an ecclesiastical attitude toward the kind of advertising that should be used—"red plush" advertising as it is sometimes called. Beautiful, aesthetic—yes. But, too lofty for the bargain-hunting instincts of the majority and too regal to match the competing advertising that is hot after business."

Advertising and Sales Promotion

Mr. F. F. Schauer, Equitable Gas Company, Pittsburgh, Pa., contributed much to the success of the meeting through his paper, "Advertising's Relation to Sales Promotion." In this he stated that the mention of gas should suggest to the customer thoughts of comfort and convenience. He also compared the growth in population and the increase in customers in various sections of the country and speculated on the effect of advertising on the same.

One of the most interesting aspects of this paper was that wherein he definitely outlined the sales and advertising policies of several companies, as far as planned advertising is concerned. These are given somewhat in detail below.

"To show how one company has to a great degree remedied this situation and is now a most hearty advocate of the well-planned and well-budgeted advertising program, I am going to refer to their Sales Promotional Department's plans for 1930. Here is a copy of a very elaborate and excellent table which they have prepared covering the entire selling activities for the current year. On it appears the schedule of campaigns, month by month. It shows the basis of the campaign bogey, or in other words, why they believe that a certain number of given devices can be sold, based on past statistics. It gives the campaign bogey both in number of units to be sold and in merchandise revenue.

"It also gives the estimated added annual revenue from gas used by the device, and the total estimated cost of the campaign. It gives in detail the amount of money that is estimated to be spent for the various forms of advertising.

"Let us take an example. In September house heating is to be campaigned. The table immediately shows us the following facts:

"It is planned to have a house heating campaign in September. Records of the previous year's sales show 454 furnaces sold throughout the entire year. Based on $200 annual revenue each, these furnaces gave a total estimated annual revenue of $90,800. For the month of September of the previous year, 96 furnaces were sold. It is conservatively estimated that 100 could be sold during the September, 1930, campaign. With this as a starting point it is then seen that these 100 furnaces could produce $20,000 estimated annual revenue. It is estimated that the total campaign cost will be $3,000; that the total merchandising profit will be $4,000.

"There follows then a detailed plan for expending the funds. It shows the amounts of money to be spent for such advertising purposes as newspapers, a sales message on monthly bills to customers, meter reader folders, prizes for employees, direct-by-mail material, window trims and general miscellaneous work."

The method employed by a natural gas company follows:

"In preparing an advertising program and budgeting the expense, nothing is more essential than choosing the devices that are the best load builders and also the proper periods of the year to promote them. To further explain this, let me give as an example one natural gas company's method. This company has approximately 160,000 domestic customers. From limited surveys and estimates their saturation of appliances is as follows:

SATURATION OF APPLIANCES

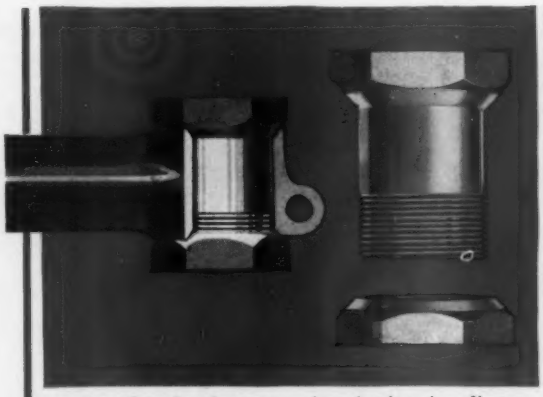
Device	*Saturation %*	*Number*	*Estimated Annual Revenue (each)*
Gas Ranges	94.4	150,392	$17 00
Hot Plates	77.3	123,150	50
Water Heaters	69.8	111,202	20 00
Space Heaters	80.0*	415,807	3 50
Furnaces and Boilers	7.1	11,309	90 00

*Assuming an average of 3 space heaters per customer for 100% saturation

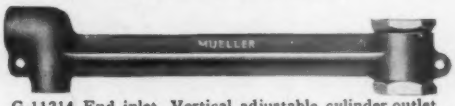
"The average income per domestic customer is $45.60 per year. The total gross domestic income is approximately $7,296,000. However, if it had 100% saturation of all the appliances I have just mentioned, the average domestic gas bill would be $130 per year instead of $45.60. The gross residential revenue would be increased thus by the difference between these two figures, or $84.40, multiplied by the 160,000 customers, giving $13,500,000. Of course, it is unreasonable to assume that they could ever get this entire potential business, but surely they should be able to look forward to getting half of it, which would mean an increase in revenue of $6,750,000, an amount almost equal to their present entire domestic revenue.

"Referring again to the saturation figures mentioned, it is recalled that their greatest potential field is house heating and the next is water heaters. By knowing, roughly, the saturation figures, efforts can be intelligent-

(*Continued on page 67*)

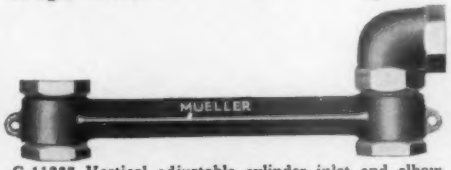


An enlarged and cutaway view showing the adjustable bevel cylinder principle.



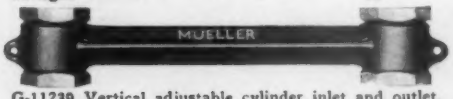
G-11214 End inlet, Vertical adjustable cylinder outlet.

	Inlet	Outlet	Swivel Tapping
5 light	¾"	¾"	½"
10 light	1 "	1 "	¾"



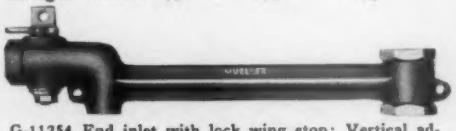
G-11237 Vertical adjustable cylinder inlet and elbow type cylinder outlet.

	Inlet	Outlet	Swivel Tapping
5 light	¾"	¾"	½"
5 light	1 "	1 "	½"
5 light	1 "	1 "	¾"
10 light	1 "	1 "	¾"



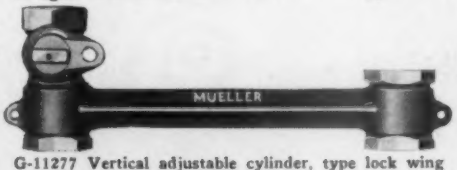
G-11239 Vertical adjustable cylinder inlet and outlet.

	Inlet	Outlet	Swivel Tapping
5 light	¾"	¾"	½"
5 light	1 "	1 "	½"
5 light	1 "	1 "	¾"
10 light	1 "	1 "	¾"
20 light	1¼"	1¼"	1 "
30 light	1½"	1½"	1¼"



G-11254 End inlet with lock wing stop; Vertical adjustable cylinder outlet.

	Inlet	Outlet	Swivel Tapping
5 light	¾"	¾"	½"
10 light	1 "	1 "	¾"



G-11277 Vertical adjustable cylinder, type lock wing stop inlet, vertical cylinder outlet.

	Inlet	Outlet	Swivel Tapping
5 light	¾"	¾"	½"
5 light	1 "	1 "	½"
10 light	1 "	1 "	¾"

Mueller Meter Hangers furnished with shelf and rods when specified.

Now a NEW Mueller *adjustable* Cylinder Meter Hanger

Fewer connections
No union joints . . .
other exclusive features

Never before has the gas trade been offered the new bevel cylinder principle upon which the new Adjustable Mueller Cylinder Meter Hanger is constructed. This outstanding improvement operated on the swivel principle and provides ample adjustment for connecting offset swivels to meter without placing the usual strain on meter tube screws.

The bevel on the cylinder and lock nut fit into a bevel recess and when tightened up make a rigid meter hanger that protects the meter from strains due to shifting of pipes and vibration.

Gas Companies are invited to write for full information of this new Mueller product which represents such a substantial development in Meter Hanger construction.

Write for the complete catalog of Mueller gas service goods.

MUELLER COMPANY (Established 1857) *Decatur, Illinois; Branches:* New York, Dallas, Atlanta, San Francisco, Los Angeles, Chicago. *Canadian Factory:* MUELLER Limited, Sarnia

MUELLER

PROMPT DELIVERIES

from stocks carried in New York, Boston, Philadelphia, Baltimore, New Orleans, Mobile.

Lux-Sponge
THE PERFECT READY MIXED OXIDE

For prompt service to the Gas Industry we are operating 2 Lux-Sponge plants located at *Philadelphia, Pa.*, and *Chicago, Ill.*

Shipments can be made reasonably prompt. Ask us for samples and prices f.o.b. your station.

"LUXIT H. T." Cement (Dry)

For Patching Hot Retorts, Refractory Linings, etc. Shipped in 110 lb. Bags.

Order Sample Shipment Today!

Philadelphia Office: 2767 Gaul Street

Chicago Office: 343 S. Dearborn Street

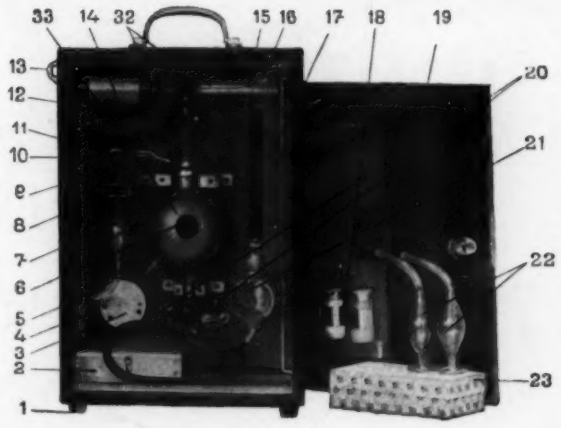
THE ALPHA—

192 FRONT STREET

HAND CALORIMETER

Dr. Strache-Kling (Loeffler Model)

For Determining the Heating Value of Gases



1. It is portable (weight under 10 lbs.)
2. It is accurate.
3. It requires only small quantities of gas for each determination.
4. It requires no water connection.
5. A determination can be made in one minute.
6. It can be operated by anybody without special training.
7. It does not require standardizing by H_2+O gas.
8. Its cost is reasonable.

The principle involved is the burning of an air gas mixture, of a known quantity of gas with a definite volume of air, in an explosion pipette insulated by means of a Dewar Vacuum jacket.

The temperature rise is recorded on an inserted thermometer. Each instrument is equipped with a computer table.

DR. OTT-LUX-GAS TESTER

For Indicating Change in Gravity of Gas, also in Heating Value of Gas

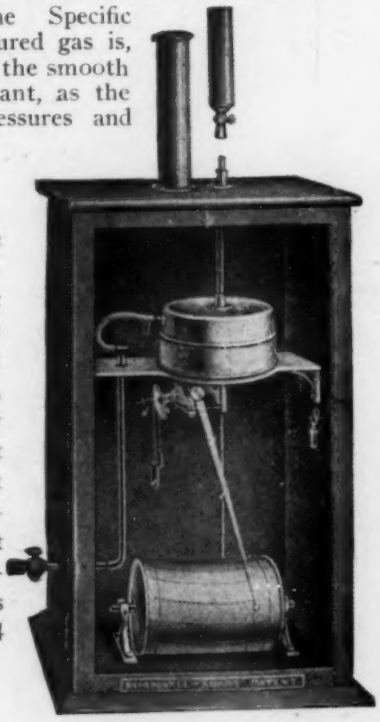
Dr. Ott - Lux - Gas - Tester is most simple in construction and operation. It combines in one operation the information usually obtained by three distinct time absorbing manipulations, namely, the **Gas Analysis, Specific Gravity determination** and **Calorimeter test.** While it is true that it cannot replace any of the three tests, where specific results are required it is equally true that it will show any changes in the gas, which are caused by **changes in composition, gravity** or **heating value.**

LUX-RECORDING GAUGE

For Specific Gravity of Gas

(Simmance and Abady System)

To determine the Specific Gravity of manufactured gas is, today, as essential to the smooth running of a gas plant, as the determination of pressures and heating values.



In the Simmance Abady System-Lux-Recording Specific Gravity balance, we have an instrument which will give us, at a glance, not only any changes that may have occurred at any time, but furnishes a permanent record of the Specific Gravity of the gas throughout the 24 hours of the day.

LUX COMPANY INC.

NEW YORK CITY, N. Y.

Cleveland Gas Meters have a reputation for dependable service, the result of over thirty years' experience in manufacturing.

Our thoroughly organized and completely equipped factory assure you that the workmanship, materials, accuracy and general efficiency are unequaled.

"A" Type Meters "B" Type Meters

THE CLEVELAND GAS METER COMPANY

2168-2180 East 65th Street Cleveland. Ohio

Publicity and Advertising Section

(Continued from page 62)

applied in the direction which will do the most good. In passing, let me say that I understand that their advertising budget for house heating for 1931 is double that of this year."

ADVERTISING PLAN AND BUDGET—1930

Schedule of Campaigns		Basis of Campaign Bogey				Campaign Bogey				Planned Expenditures of Funds							
Month	Campaign	E.A.R. Each	Sold Same Month 1929	Total Sold 1929	Total E.A.R. 1929	Est. Sales	Total E.A.R.	Total Campaign Cost	Net Mdse. Profit	Newspapers	Monthly Bills	Meter Reader Folder	Employees	Direct Mail	Window Trims	Booths	Printing	Misc.
Jan.	Range	$ 18.00	588	3518	$63324	600	$10800	$2500	$15000	$1600	$50	$500			$150		$50	$150
	Laundry Eq.	2.25		36	81	20	40	500	200	450								50
Feb.	Radiantfire	5.50	44	1316	7238	50	275	500	450	400	50							50
	Range	18.00	261	3518	63324	300	5400	2000	7500	1800								200
Mar.	Water Heater	20.00	141	492	9840	150	3000	2800	1500	1500	50	600	100		150			400
	Laundry Eq.	2.25		36	81	10	20	500	100	450								50
Apr.	Range	18.00	546	3518	63324	600	10800	2350	15000	1500	50		100		150		50	500
	Water Heater	20.00	43	492	9840	50	1000	700	500	500								200
May	Range	18.00	455	3518	63324	500	9000	1650	12500	1500	50							100
	Incinerator	2.25		3	7	5	10	500	125	450								50
June	Water Heater	20.00	21	492	9840	40	800	1000	400	940	60							
	Range	18.00	200	3518	63324	200	3600	1500	5000	1200					150			150
July	Range	18.00	168	3518	63324	175	3150	1500	4375	1200	50		100		75			75
	Incinerator	2.25		3	7	5	11	500	125	500								
Aug.	Laundry Eq.	2.25		36	81	15	33	500	150	450	50							
	Incinerator	2.25		3	7	5	11	500	125	500								
Sept.	House Heating	200.00	96	454	90800	100	20000	3000	4000	2000	50	600	50		50			250
	Radiantfire	5.50	239	1316	7238	240	1320	1000	2160	1000								
Oct.	Water Heater	20.00	61	492	9840	100	2000	2500	1000	1500	50		200		150		100	500
	Heaters (Gas)	10.00	22	185	1850	25	250	1000	125	1000								
Nov.	Range	18.00	190	3518	63324	200	3600	1500	5000	1200	60		50		50			140
	Water Heater	20.00	35	492	9840	40	800	1500	400	1200								300
Dec.	Range	18.00	129	3518	63324	200	3600	1500	5000	1200	60				100			140
	Radiantfire	5.50	200	1316	7238	200	1100	500	1800	500								

Accounting Section

Time Saving Equipment, Proper Selection of Personnel and Accounting Matters Receive Attention

John I. Blanchfield, Chairman-elect, Accounting Section

THE Accounting Section certainly came into its own by way of its Chairman, Mr. John L. Conover, Public Service Electric & Gas Company, Newark, N. J., receiving the Munro Award for the outstanding contribution to the Gas Industry during the past Association year. The winning of this award by Mr. Conover was especially noteworthy in view of his many duties in conducting his own particular work with his company together with acting as Chairman of the Accounting Section.

The meeting of this section served to impress one with the growing importance of time saving machinery and devices in gas company accounting matters. In this connection practically a whole day was devoted to an open meeting on General Office Machine Accounting Plans. The proper selection of employees for accounting and office positions also came in for more than passing attention and discussion.

The "Report of Sub-Committee on Accounting Ma-

chine Development," by Chairman Herbert E. Cliff, Public Service Electric & Gas Company, Newark, N. J., gave a fine summary of the various time saving office machines that are now available, insofar as billing and bookkeeping are concerned. This report is concerned chiefly with improvements and new developments. Below are given some of the high spots of this report.

Addressograph Company has developed a combination bill printing and addressing machine which cuts the paper to bill size, punches and prints the bill form on both sides, including advertising and other matter, and fills in the name, address and descriptive data from the Addressograph plate, all at a speed greater than the addressing alone was done on the old model. Single or forms with one, two or three perforated stubs can be printed and the printing and addressing is completed at the rate of 8,400 impressions per hour. For bills with three stubs this is equivalent to a production of 2,100 bills per hour.

The operation of this machine is entirely automatic and the maximum length of bill that can be printed is 18 inches—maximum depth six inches. No special grade or weight of paper is required and each roll may contain as many as 40,000 bills, depending upon the size desired.

The machine is available with a ribbon re-inker which constantly replenishes the ink supply in the ribbon through which the Addressograph impressions are made, thus reducing this item of expense. Appreciable savings are claimed for this machine.

All Burroughs portable adding machines are now equipped with electric motors which are contained within case of the machine and do not affect its portability. A number of portable models are being used by small companies for writing bills. These machines can be used as straight adding machines when not required for billing and one model has been so constructed that it can print the words or symbols such as "Present," "Previous," "Cu. Ft.," "Total," etc.

This company has recently released a portable electric duplex adding machine which contains two separate accumulating sections and which will be found useful for counter work in the cashier's office, for auditing cashier's collections and for distributing the amounts to ledger control units. One register can be used for obtaining totals by cashiers or by ledgers and the other for the grand total, thus eliminating the necessity of summarizing.

The multiple register machines used for public utility billing and for ledger posting, such as stores ledgers, operating expense ledgers, accounts payable ledgers, etc., have been improved in mechanical construction and operation during the year.

John L. Conover, auditor, gas department of Public Service Electric and Gas Company, and Retiring Chairman of the Accounting Section, received one of the highest honors open to members of the gas industry, when he was presented the Charles A. Munroe award, for "the most outstanding contribution during the year in the general interests of the gas industry."

The award consists of an engrossed certificate and $500 in cash.

The accomplishments which won the award for Mr. Conover were made in connection with the installation of a central machine accounting system for customers billing and bookkeeping and in the application of machine accounting principles and practices in practically all other accounting branches of the Public Service Electric and Gas Company organization.

The committee on award, which picked Mr. Conover from a list of seven well-known gas men to be the recipient of the award, declared in its report that the machine accounting system which Mr. Conover was instrumental in installing has been of benefit to the company's customers, has reduced clerical costs, has served as a model for other utility companies and has served as a stimulus to the manufacturers of accounting machines.

An improved carriage has been developed which facilitates the feeding of ledger sheets and of most sized bills. The machine is faster in operation and in most cases eliminates blank strokes before totals. Other new features on this type of machine include automatic selection of columns and automatic repeat printing of items on the reverse movement of the carriage.

As an aid to billing, the Burroughs Company has placed on the market a standard meter book holder, adjustable for various sizes of end-opening binders.

Buxton and Skinner Company have brought out a utility chart and billing rack which is designed to speed up machine billing by affording a convenient rest for meter reading sheets and a ready reference to rate schedules. The meter reading binder is placed on the right side of the lower section of the rack. The binder is then unlocked, the top cover is placed to the left of the sheets and both sections of the binder are connected with an arch which is placed over both posts. The sheets are paged over the arch as they are completed.

The upper section of the rack holds a rate chart approximately 14 in. x 17 in. Smaller auxiliary charts can be attached to the left of the main chart. In operation, the biller refers to the rate chart for computing gross and net amounts while manipulating the sheets over the arch.

The Buxton and Skinner Company recently has added to its line thirteen additional meter reading sheets for various classes of commodity service. These sheets, all of distinctive colors, are 4½ in. x 9 in. in size and are designed for two- and four-year records of readings and consumption, in addition to complete billing data, changes of names, etc.

The Elliott Addressing Machine Company, has developed a combination bill printing and addressing machine machine specifically designed for public utility bill form preparation.

The new Elliott machine, in a continuous automatic operation, prints the bill form, then prints the dates, name, address and descriptive data as shown on the stencil and perforates and chops off the completed bill from a roll of blank paper, at a speed of approximately 7,200 imprints per hour. Individual bills can be from two and one-half inches to four inches in width, from 10¾ to 17 inches in length and can have from one to four stubs. The paper stock is furnished in blank rolls the desired width of the bill form.

The printing is done from electrotypes supplied by the Elliott Company. These electrotypes are fastened to a cylindrical printing drum in segments so that variable data can readily be changed. Printing can be done on both sides of the bill.

The Elliott address cards are made of fibre and can be stenciled on a regular typewriter. A single stencil prints its address as many times as required on the bill and the stubs. Then, as each bill is completely printed and addressed, the next stencil automatically comes into position to address the following bill and stubs. Stencil cards can be inserted and removed while the machine is running.

International Business Machines Corporation—Tabulating Machine Company Divisions report the automatic checking tabulator, a development of the automatic control tabulator, which is of great value in connection with the punched card plan of consumers' billing. In operation, the tabulating billing cards, after having been punched for meter readings and consumption, are passed through this machine and all cards where the consumption does not equal the difference between the two meter readings are automatically rejected. In this way punching errors and subtraction errors are automatically located. This machine operates at a speed of 150 cards or meters per minute.

Remington-Rand Business Service, Inc. reports a new Remington shuttle carriage billing machine which is equipped with a sub-carriage for carrying the customer's bill and makes it possible to vertically space the printed data on the bill form and at the same time print this information in a straight, horizontal line on the abstract or register sheet, with the amounts for the various rates arranged in individual columns.

Postcard bills can be prepared showing in vertical form on the customer's record the breakdown of each step of the rate, both gas and electric, and on the register sheet this data will be printed horizontally in the various rate columns. This arrangement on the register sheet facilitates the auditing process.

This company has also recently placed on the market a fanfold typewriting machine which will operate with either fanfold or superfold forms. This company states that the new machine offers increased visibility, better manifolding and hence clearer copies, and alignment and adjustment features which assist in easier and more accurate operation.

Proper Selection of Employees

The "Report of Committee on Office Personnel," A. M. Boyd, Chairman, contained much valuable data. This report discussed the methods of evaluating the capacities, abilities, and accomplishments of each employee and the methods of making or inducing adjustments. These methods were summarized under the following topics:

The Application Blank—pertaining particularly to past training and experience.

Training Plans—Syllabii and reports of individual accomplishments.

Methods of Measuring Production.

Tests—pertaining to proficiency in operations.

Rating Scales—for appraising individual proficiency and progress.

Promotion Scales—including time intervals for rate increases.

Premium and Bonus Plans.

Requisition Blanks—relating to position requirements.

Methods of Making Transfers.

Medical Examination for Adjustments.

Interviewing for Adjustments—including the termination interview.

"Too often," said the report, "personnel departments consider a person's potentialities in relation to some probable future job rather than his merits in his present job in which he is likely to remain for a considerable time. Therefore it seems more important to judge his success in his present job as the basis for his salary than his qualifications for some other job which may never materialize.

"Evaluating the capacities, abilities and accomplishments of an individual employee on a particular job by ascertaining the quantity and quality of work which he actually does reduces to a minimum the factors of opinion and personal impression. If a man's job is to do a particular piece of work, facts and figures on the quantity and quality of the work which he does seem to be logical bases for determining his value as compared with that of the man next to him doing the same work, or as compared with his own value during a previous period. Measurements of a man's productivity on the job are necessary for this purpose."

The report went on to state that "tests for indicating aptitudes of various kinds and intellectual and emotional qualities are psychological in character and they are well known in connection with making placements. Adjustments are frequently made by changing persons to different positions and such tests are applied in these cases just as in cases of original placements. These tests are of two classes, paper tests and performance tests.

"In order to use psychological tests successfully, it is necessary that a psychological analysis of the job for which the person is to be considered be made by a person trained in this work. Then he can select, validate and apply the tests necessary to detect the required characteristics of the individual.

"A number of companies are using psychological tests such as the Otis Self-Administering Tests, the Thurstone Employment Tests for clerical work, typing, etc., and, in a few instances, tests for supervisory abilities have been used with good results."

Relative to medical examination of employees the report states the following:

"With clerical employees, the necessity for adjustments for physical reasons is not so frequent as with mechanical employees but there are many cases in which adjustments for physical reasons can be made to great advantage. There is great diversity among clerical positions. Some require closer application of sight, hearing, touch, etc., than others and there is diversity in physical dexterity, nervous strain, etc. In many instances, therefore, the medical examination can be of advantage in making adjustments for increasing efficiency in office positions as well as mechanical positions."

The report also indicates the good work that is being done in properly advising with the employee as well as finding out definitely why they leave the company's service. These observations follow:

"One of the functions of the Personnel Department is to extend to employees the advantage of counsel through consultation on matters concerning their positions, their opportunities and their development. A number of the companies report that this is being realized and adjustments of individuals for increased efficiency are being effected by this means. Sometimes it is by determining upon a course of training, sometimes by correcting wrong impressions, sometimes by correcting improper working conditions."

"It is highly important that every person upon leaving

should be interviewed in the Personnel Department in view of making adjustments in concurrence with employing officers, if possible, but, at least, to give the employee an opportunity to express himself and have the proper reason for termination ascertained and recorded."

FEBRUARY 1926

Column Numbers		*Average Posting Time*		*Ledger Clerk*		*Transfer Department*			
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Rank	*Ledger Clerk*	*Number Tickets Posted*	*Total Time Posting (Min.)*	*Extra Certificate Numbers Posted*	*Time Posting Extra Cert. Numbers (Min.)*	*Number New Accounts Opened*	*Time Opening New Accounts (Min.)*	*Net Posting Time Minutes (Weighted Variables Deducted)*	*Average Time Posting Per Account (Min.)*
					((5) x .44)		((7) x 1.05)	(4)—(6)—(8)	(9) ÷ (3)
1	Harris	439	630	55	24	114	120	486	1.11
2	Johnson	526	728	63	28	114	120	580	1.15
3	Smith	460	675	47	21	106	110	544	1.18
4	Elman	528	895	44	19	110	115	761	1.47
5	Martin	444	805	51	22	108	113	668	1.51
6	Doe	456	921	68	30	107	112	779	1.70
7	Taylor	347	695	40	18	69	72	605	1.77
8	Brown	414	1,040	47	20	107	112	908	2.19
9	Allen	432	1,135	81	36	129	135	864	2.23
10	Davis	533	1,345	132	58	123	129	1,158	2.23
11	Green	387	990	55	24	85	89	877	2.27
12	Murphy	466	1,280	32	14	131	138	1,128	2.43
13	Black	437	1,305	45	20	119	125	1,160	2.65
14	Jackson	169	525	39	17	55	58	450	2.67
15	Baker	238	790	48	21	83	87	692	2.86
16	Mitchell	478	1,540	102	45	114	120	1,375	2.87
17	Anderson	268	935	81	36	54	57	842	3.13
18	Boyle	317	1,131	44	19	94	99	1,013	3.25
19	Moore	184	895	28	12	49	51	832	4 52

General Average for February—2.16

Average time posting per extra *Cerificate Number*—{ 44 min. / 26.5 secs.

Average time opening *New Account*—{ 1.05 min. / 63.5 secs.

Home Service Meeting

Papers and addresses attest to value of Home Service in gas industry

EACH year sees Home Service presenting a more varied and valuable contribution to Convention activities. The recent Home Service meeting at Atlantic City, under the leadership of Miss Ruth Soule, Brooklyn Union Gas Company, Brooklyn, New York, was productive of much tangible data and information which should convince the skeptic and any timid souls who are on the fence that this branch of gas company work is far removed of the experimental stage. Accordingly, it is no longer a question of whether any gas company should install Home Service but rather, how can such a company get along without it.

One of the best papers presented at this meeting was that of Miss Leah Anderson, Ruud Manufacturing Company, Pittsburgh, Penna. It is reproduced in full herewith.

Karen Fladoes, Chairman-elect, Women's Section

PROBABLY no one appliance using gas has received a greater liberal treatment, closer analysis and undivided enthusiasm of gas executives than the automatic gas water heater.

The reason for this is so elementary and evident that further discussion is unwarranted.

Viewed from the angle of analysis there is one main task, that can be simply stated but not so simply answered. If more automatic water heaters are to be sold the public must have a better appreciation of how important such a service is in the home. With this ac-

ceptance the resistance met by the sales department diminishes.

Looking at it from the Utility's side there are certain tools with which they have to work. In the past the Sales Department in conjunction with the Advertising Department has borne the brunt of the task. That this condition will always confront us must be accepted.

Fortunately, however, there is another "Key" that has proven its worth in the past in other channels and if they attack the problem with the same energy, intelligence and willingness expressed in these other directions, will in a short space of time accelerate materially the present merchandising programs of the gas company. I refer to the Home Service Department.

This statement is quite a broad one and yet it is made in all sincerity and after careful specialized study from a manufacturer's view point during the past eighteen months.

The prospect is set up as the goal of a gas company. When we say prospect who do we mean? It is a cold word and must be transposed to think of the problem with enthusiasm.

The Prospect is Mr. and Mrs. Jones and all the little Jones'. Real people—human beings. It has been said that the female of the species is more deadly than the male and this is true in that Mrs. Jones is the one person in the household with whom we must deal. If Mrs. Jones wants something and sets her heart on it the money will be forthcoming from Mr. Jones even though he wear an overcoat the third and even the fourth season.

The whole angle of approach then must be from the woman's point of view. Mechanics, technical information must be subordinated. Indeed, it has its place but only that sufficient knowledge of the product will instill confidence in Mrs. Jones' mind that it will perform satisfactorily and do what is claimed for it.

Mrs. Jones must be made to know in a real practical way what automatic hot water service will do for her. She wants to know how it will affect her personally. Will it save time, if so, how? Can she perform her household duties quicker and better? Does it have any bearing on her personal attractiveness? If she has children then how will it affect their lives? Then last, how about Mr. Jones?

What Department of the Gas Company is better fitted to approach Mrs. Jones, give her the information needed and in such Homeopathic doses that she will not even associate it as being "Sales Arguments" than the Home Service Department.

If you have agreed with me to this point then the next logical question is how and where may I look for information and what kind of information should be used and when?

There are five major channels for approach.

1. Home Service Classes
2. Home Contacts
3. Radio
4. Printed Matter
5. Inter-Company Meetings.

Home Service Classes

It is accepted that a child learns by observation. Surround a child with good table manners and you will have a child that will never embarrass you. This is true of us all to one degree or another.

If the Home Service Director has an automatic water heater on the platform connected to a modern, attractive kitchen sink she has scored number one. If in the normal course of preparation and demonstration she makes use of hot water and explains the advantages of such use, even though it be in a casual way, point number two is scored.

You, better than I, can suggest how this should be done but these few thoughts might help.

Before touching a single dish or food wash your hands in hot water.

When mixing bowls and utensils have served their purpose soak them in hot water.

If spinach or like vegetable containing sand or grit is to be served, clean it in hot water. Explain how hot water plays an important part in ridding sand and grit without discomfort to the hands experienced with cold water.

If laundry equipment is being demonstrated explain the use of hot water for complete dissolving of chips or flakes. The same thing is true of preparation to wash the dishes. Give a simple formula for the easiest way to handle this unpleasant household task.

Recipes for washing woolens such as blankets brings into play the liberal use of hot water and the advantage of a plentiful supply in order to secure uniform satisfactory results.

Many contributions have been made by manufacturers of soap products that will aid you materially.

Time will not permit of further elaboration on this phase of the subject.

Home Contacts and Radio

If you are in Mrs. Jones' home to solve her baking or cooking problems turn to the nearest faucet and wash your hands. In two minutes you will know more of Mrs. Jones' hot water supply than a salesman could get in a week.

Lack of hot water may bring an apology and with it an opportunity to do some constructive work. It can be done with grace and not smack of selling.

No matter what the main purpose of your home contact whether it be cooking, refrigeration or a good will call, opportunity after opportunity will present itself, indeed, might ever suggest itself.

It is granted that the matter requires diplomacy but ingenuity is the Mother of Diplomacy.

In the past radio has been liberally used and agencies such as the Cleanliness Institute and manufacturers have originated informative and instructive material that can be the basis of a complete talk or broken down and made part of a talk on another subject.

The Gas Company Employees need to have the value of automatic hot water service interpreted to them from the Home Service point of view. The editors of gas company employee bulletins will more than welcome contributions of such nature from you.

Sound information on Hot Water and its use has a rightful place in House Organs published for the customer. Your department will only be represented in direct proportion to the interest you show in contributing articles that can be used in it.

Short pertinent paragraphs in announcements of Home Service Classes and in recipe sheets are worthwhile. Talk to your advertising manager. Most any layout he makes for a water heater advertisement has room for a small box in which you can tell Mrs. Jones how she can employ hot water to better advantage. Mrs. Jones cannot seek such information but will be quick to appreciate the helpful hints. Winter cleaning, removal of stains, improved household methods, can be woven in a very short message.

Gas companies are liberal users of newspaper advertising space. Local editors will welcome and use timely,

informative articles on the use of hot water. The only cost is time spent in preparation.

It has always been my opinion that a better understanding and appreciation of Home Service Departments could be brought about if the Home Service Director made it a point to talk at Employee meetings and particularly before sales meetings.

What better opportunity to sell your department? What greater means could the Sales Manager ask for than that of having a woman give her impressions and reactions to the merits of automatic gas hot water service? In what manner could salesmen secure renewed inspiration, a new outlook on an appliance they are asked to sell aggressively?

Review all the things suggested or implied and the underlying motive of each is—PUBLICITY—consistent, intelligent, informative. And plenty of it.

Does it smack of commercialism, or direct selling effort? I believe not and feel that with more constant focusing of this group's attention to the general problem will bring forth better means, different channels of attack, new thoughts and an increased sale of gas by means of the automatic water heater.

That the manufacturer of the appliance has a responsibility in assisting the Home Service Director to the extent of doing necessary research work, preparation and distribution of assembled data, is being more readily recognized by leaders in the field. The organization by the manufacturer of their own Home Service Department must come about and it has in at least one instance. Criticism, constructive in nature if possible, is warranted and needed.

Regulators and Governors

THE uses of the various types of regulators are numerous and vary to a great extent. The Holder Governor is used for one purpose only; being installed at the outlet of the holder, referring to a water-seal holder, to reduce the holder pressure from an inlet pressure in inches to a lower outlet pressure in inches. The District Station Regulator is used for reducing the pressure from a high pressure transmission line carrying a pressure of any number of pounds up to 50 pounds to a low or outlet pressure in inches, feeding into the distribution system.

Modern Type Automatic District Station Regulator: This regulator reduces pounds inlet pressure to inches outlet pressure and will automatically increase and decrease the outlet pressure according to the demand. It is set for a minimum and a maximum outlet pressure, which may be varied according to the conditions, and when the demand or peak-load comes on it will automatically increase the outlet pressure to the maximum it is set to deliver, providing the demand is sufficient to cause the regulator to increase the outlet pressure to the maximum. As the demand decreases it will automatically decrease the outlet pressure to the minimum it is set to deliver. This operation is repeated as many times as the demand requires.

Electrically Remote Controlled District Regulator: This regulator will reduce pounds inlet pressure to inches outlet pressure and can be set for the minimum and maximum outlet pressure as desired. It is controlled by an electric by-pass valve, and a timing-element which may be placed at the outlet of the regulator or at any remote distance from the regulator as desired. This device will increase and decrease the outlet pressure from the minimum to the maximum one, two or three times during the peak-hour demands, according to the setting of the timing-element.

Intermediate Sensitive Type Regulator: This regulator is made with balanced valve and dead weight type for an intermediate or low inlet pressure from inches to 5 or 10 pounds, and will reduce same to a constant outlet pressure in inches. This type regulator is used where very sensitive regulation is required for industrial installations, and is controlled by the outlet pressure floating underneath the diaphragm. The outlet pressure can be increased or decreased by adding or removing weights as desired.

Modern Remote Controlled Industrial Regulator: This regulator will reduce any number of pounds inlet pressure up to 100 pounds to an outlet pressure anywhere from 6 inches to 1 pound. It can be remote controlled by carrying the control pipe from the master bowl to any distance from the regulator up to 200 or 300 feet and placing a gauge at that point and weight the regulator for the pressure desired at the point of connecting the control pipe. However, if it is not desired to remote control the outlet pressure of the regulator, it can be controlled directly at the outlet of the regulator.

Sensitive Type High Pressure Regulator: This regulator will reduce an inlet pressure up to 100 pounds to an outlet pressure not to exceed 50 pounds, and is made especially for use where gas is metered under high pressure, or for extreme outlet pressure as high as 50 pounds.

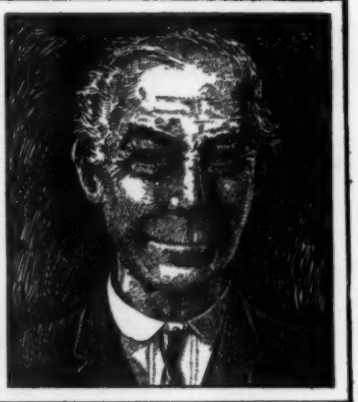
High Pressure Line Regulator: This regulator is controlled by the aid of a master bowl and will reduce an inlet pressure up to 100 pounds to an outlet pressure ranging from 1 to 5, 5 to 15 or 15 to 25 jounds, as desired. This regulator is largely used for reducing a high pressure to a lower pressure on a distribution system where individual service regulators are used.

Individual Service Regulators: These regulators are made in various sizes for high, intermediate or low inlet pressure. They are made of the dead weight type or of the spring type to deliver the various outlet pressures as may be required and are made with various size orifices depending on the inlet pressure. They are made with or without mercury seal or with dead weight safety seal, as desired.

Regulator Specifications: In specifying regulators for various requirements careful consideration should be given to the conditions under which they are to operate, taking into consideration the present conditions as well as anticipating the future requirements so as to specify the proper regulators.

In ordering regulators the manufacturer should be given the proper information, which will eliminate misunderstandings and avoid mistakes and delays in making shipments. This information should always include: the size inlet and outlet pipe and the type of regulator desired, the kind of gas and the specific gravity of same and the approximate volume of gas the regulator will be required to pass in cubic feet per hour, basing same on peak-hour demands, also the maximum and minimum pressure that will be maintained at the inlet of the regulator and the pressure to be maintained at the outlet of the regulator.—*Talk given at Purdue University by J. C. Groble.*

Letters from a Gas House Terrier to His Grandson



Dear Sam:

In driftin' around gettin' my digestion back to earth, follerin' overworkin' it in my wholesome and hog-like efforts to get my money's worth at one of them Boardwalk American-plan hotels, I stumbles into your Big Boss t'other day. He sort of sounded me out with respect to me bein' kin to you; and I sort of admitted that a man can't help his kinfolks. After which the talk started.

And where I gathered that while you are a pretty high-grade kind of a pup in th' Old Man's eyes, they's suspicions yet on his part that at times you're still a pup an' likely to lick blackin' or go off chasin' some tom-cat that older dogs is learned how to ignore with discretion disguised as dignity.

Specifically, he was citin' your pained an' youthful amusement at his wantin' you to slip him a report givin' him an' your outfit the low-down on the gas convention as you seen it—at your company's expense—last month. Not that I'm goin' to mount the rostrum on that point here now, because I understand that when th' Boss was through you had seen the light an' turned in a Report indicatin' that you had been somewhere besides dinin'-rooms an' some manufacturer's representative's bed-bar-an'-bath room combined durin' the Big Week. An', what's more, some of the things you said in it hit a responsive chord in both of us. —Like the part about th' Convention speakers, f'rinstance—

Sam, they aint really but two kinds of mechanical trouble with the average convention speaker: either he's got too much engine for his brakes; or too much brakes for his engine. Th' boys in th' first class spreads a good fifteen-minute paper out over a forty-five-minute platform appearance, with th' result that their presentation has all th' snap an' sparkle of a lump of cold suet in yesterday's soup. They're longer than a Memorial Day parade in passin' a given point. And when you foller up one of them soothin' speeches with darkenin' th' room for thirty-minutes additional showin' of lantern-slides, Nature and th' after-effects of the big party in room 1994 last night just naturally gets in their work an' puts a lot of otherwise good gas men to sleep. Not that they aint often somethin' valyuable concealed in the verbiage, but—like th' Scotchman who dug the Grand Canyon while tryin' to find a quarter he'd dropped—they's too much effort involved in recoverin' it for the results gained.

For the second or over-short type, there's more explanation but less excuse. They assume that everybody present has already read their report or paper beforehand. Which is gen'rally flatterin' and, like most flattery,

slightly inaccurate. For in these days of movies, radio, football, an' big business, they aint hardly ever time between conferences for a man to read the

sportin' pages an' th' detective story magazine he keeps hid in his desk; let alone dippin' into somethin' that he figures he's goin' to hear at a meetin' anyhow.

The trouble is, he don't hear it then: he hears all too-often a mere half-baked summary, or a hasty-cooked sketch--an outline that's like a razor-back hog: all bones an' no meat. Follered by discussion from the fore-armed five or six that might be interestin' if he knew what it was all about.

Another point in your report rung th' bell with me,too. I was over in the auditorium sort of sniffin' around th' equipment exhibits an' checkin' up on where I might be out-of-date in my idees. And I got to feelin' kind of low-sperrited an' lonesome, like a potater-bug on a chip in th' middle of th' Atlantic ocean, when all of a sudden it come over me what was causin' my melon-kolly: With no meetin's in session, they still wasn't hardly no gas men at all in there. Th' manufacturers' boys had 'em out-numbered forty-seven an' a half to nothin'. Which sounds too bad for th' manufacturers--and <u>is</u> too bad for th' gas men. For they may not have to buy everythin' they see, but they sure have got to see first everythin' that they ought to buy. An' when th' last word in every kind of equipment in my line, from pins to pipe, is fetched to one good place for me, you aint goin' to ketch me runnin' no risk of overlookin' a chance to see somethin' that'll cut a cost or head off a future drop in pressures or profits.

One thing you didn't mention, son, was worthy of comment. An' that was th' absence of prominent gas men swingin' down th' Boardwalk nine-abreast, shoulderin' fifteen-story hotels aside an' singin' The Watch on the Rhine on full stomachs. Not that there was ever a' undue amount of that, p'rhaps; but, like sand in your spinach, a little of it goes a long way.

All in all, Sam, it was a man's size convention. And conspickyous for th' dertemination vizible all around me to learn everythin' possible at it. They was a lot of evidence, too, of bein' open-minded about reckognizin' that th' old industry's about in mid-channel of undergoin' a radical overhaulin' fo' th' good of th' order. They're thinkin in bigger figures, an' they aint scarin' 'em to death like they once would. Two cookin'-stoves an' a hot-water heater is no longer th' boys' idee of a big boost to th' load. They're sellin' more stoves an' household gas-burnin' gadgets than ever, of course; but they're beginnin' to see 'way beyond that now.

House-heatin', not gas-jets, is the cry. Takin' in your fuel through a pipe an' lettin' your chimney be your ash-man, is beginnin' to capture th' public's imagination; causin' new gas-holders to loom against th' sky, new mains to grid th' streets.

Industrial gas, follerin' on th' heels of th' new natural gas supplies, is comin' faster an' faster. Th' old order is changin', an' th' old idees of a fixed demand bein' met with a fixed an' grudgin' supply is already gone. You may worry a little now about where you're goin' to sell the gas; but before you die you'll be worryin' about where you're goin' to <u>get</u> the gas. Not that there won't be plenty and oceans of it-measured by present-day standards. But what I'm tryin' to get over to you in time, son, is that new standards are already so near that they're practically here. And they's figures in 'em that'll dizzy you,if you aint got your feet on the ground an' your head high. So,

Yours for more gas and bigger gas men.

Monoxide Mike

XV- The Health Givers of the Cellar, Incinerator and Laundry Equipment

THE health givers of the cellar are the more recently popularized appliances which give great service, but are so completely hidden. The incinerator with its simple sanitary method of disposing of waste and the gas laundry, the insurance of clean, sterilized, well pressed linens and other fabrics are giving health on one hand by the complete destruction of refuse material which through decomposition could cause disease and on the other, by removing dirt and other foreign matter from all textiles, wearing apparel or household linens. A market worth cultivating, as yet untouched, but with distinct sales appeal to the customer, a gas load almost uniform throughout the year adding for both purposes at least 30,000 cubic feet annually.

The Incinerator

The incinerator offers a field for public service unequalled by any other gas appliance, and at the same time will add materially to the gas company income. The incinerator can be made to eliminate all garbage collection other than furnace ashes. Carting partly decomposed and smelly garbage to a public dump offends not only the nose but also good taste. Statistics have been prepared which show that the installation and operation of the incinerator will actually save a community money. This seems questionable as it is probable that the cost of garbage removal alone is less than the gas cost of operation. It is more than probable that cost expressed in overall benefits is less with individual incinerating plants than for garbage collection.

Unfortunately incinerators can be more easily operated incorrectly than other gas appliances. Garbage, the remains of meats, fruits and vegetables, is mostly water. The moisture contents of these classes of substances varies between 65% and 92%. The major part of incineration then is drying. If the main drying is carried on during the incineration process, a chemical decomposition takes place and offensive smelling volatile substances pass out with the water vapor and the incinerator is unjustly blamed for the poor operation. Garbage should not be stewed. Proper incineration takes care of all household waste; rubbish, such as newspapers, cartons, wrapping papers; garbage and all other combustible waste. Consuming a mixed waste of this kind, the main problems of incineration are reduced. Rubbish gives a lightness, permitting air to pass through the load, drying the materials a great deal. Drying in a current of air (the incinerator is always flue connected) retards decomposition and actually eliminates much moisture. Loading takes place as material accumulates. Newspapers will probably be added in the morning, then the garbage from lunch and dinner handily wrapped, then more papers until the incinerator is fairly well filled. Even after 3 or 4 days accumulation and very great apparent drying, no odor is noticeable. A charge loaded in this way will burn all over and complete the drying to such an extent that "stewing" and odors will scarcely ever follow.

With attention paid to the loading, the operating costs will be trivial. Incineration on a comparatively large scale is negative as a gas load. In an apartment house or hotel, the mount of rubbish, newspapers, crates, bags, etc. is so large that all the garbage is burned without a bit of added fuel. In fact, the modern hotel is at a loss if coal or coke or even a sprinkling of oil for starting is needed to consume all the refuse. The householder does not have the same volume of combustible rubbish, his groceries and vegetables are not delivered in crates or packing boxes, so that some additional fuel is needed, but very little indeed.

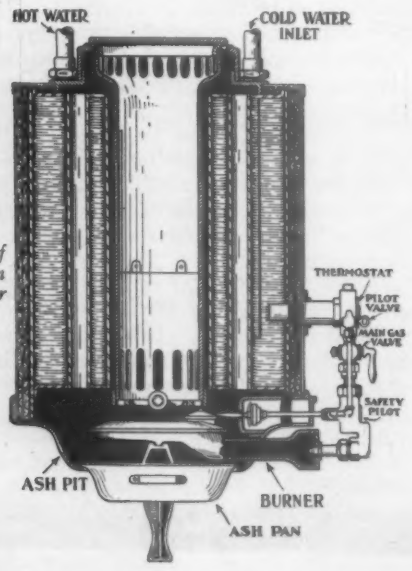
Construction

Incinerator construction follows that of all standard gas appliances. The frame and body are of cast iron or steel heavy enough for the work. The jackets are covered with either vitreous enamel or heat resisting paint. Burners are of special design to prevent clogging but follow standard mixer and throat specifications as far as possible.

More specifically, the incinerator burner is of the ring or bar type with drilled or slotted ports directing their flames outward. This port location protects against dripping and clogging, but in addition a hood projects just beyond the edge of the burner to further prevent any harmful effect on the issuing gas. The burners are one piece castings with the venturi throat and mixer. In some designs the burner pivots either to one side or drops to allow the grates to be dumped of the residue. The flame plays through cast iron grates on the charge above. Grates in most incinerators differ from boiler or furnace grates in being inclined. This allows the heat to cover a greater area and pass around the basket-like container, the sides of which may be of open grate construction or of ribbed cast iron with numerous openings for the admission of heat. Part of the heat is deflected to a flue passage in the centre of the incinerating chamber. This may be made of a slowly tapering cone or additional vertical grate sections. The function of this flue passage is to start incineration throughout the charge and also heat uniformly after the easily combustible material has burned out. Distributing the heat in this manner pre-

vents overheating of the material immediately above the grates. Overheating produces a coke like mass which protects the remainder of the charge against further incineration.

The waste hopper is of cast iron, either round or square, provided at the bottom with shaking or dumping grates. In the center of the waste hopper is a cast iron flue passage for speeding up the preliminary and final stages of incineration. The flue passage has regularly spaced openings permitting the hot products to act on the charge. At the top of the waste hopper is a loading door through which refuse material is added. The waste hopper is surrounded by cast iron or sheet steel fire casing, this in turn being separated from the double outside casing by a suitable air space which insulates by a current of cool air being drawn in and up from the outside of the casing.



Sectional View of Duo-Tor Combination Incinerator and Water Heater

Beneath the dumping grate of the waste hopper is an ash pan to catch all ash that sifts through the grates and any non-combustible matter (tin cans, etc.) or unburned refuse dumped from the grates. Ash pans are of sheet iron suitably braced and provided with a handle for removal and carrying. Ash pans should slide easily in the base without kinking or binding.

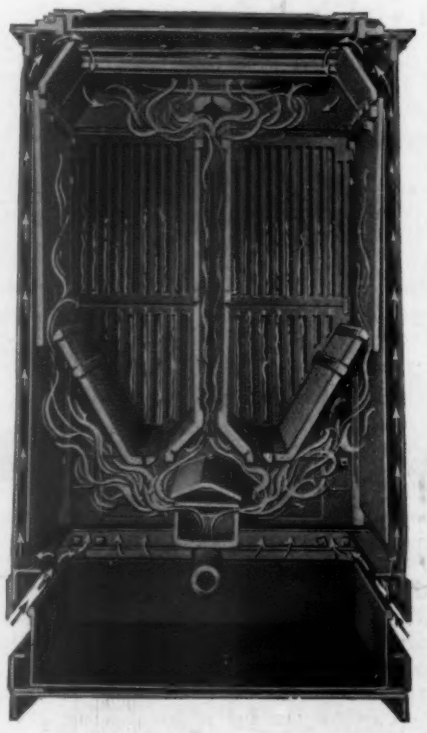
The ash is kept in a space made by the incinerator base. This base serves not only to support the entire incinerator but also allows secondary and cooling air to enter the body.

Products of incineration are usually taken off the back or rear top of the incinerator at a point sufficiently high to preclude any air or gas pockets within the incinerator body. The flue collar must be solidly connected to an effective flue without a draft hood in the line.

The combination of an internally fired storage water heater with a simple incinerating section is a development of comparative recent times. The tank of the water heater instead of being a complete cylinder has the cross section of a ring or doughnut. The cast iron incinerator bowl sets in the central hole, supported by the top ring which in the shape of a hood gathers all the combustion products and delivers them to the flue. The outside of the storage tank is well insulated reducing the standby losses from the surface of the tank. Inasmuch as the appliance must be solidly flue connected, a constant current of cold air is drawn through the fire tubes increasing greatly the standby losses from these points.

The temperature of the water is thermostatically controlled so that the flame which heats both the water and incinerating chamber burns at periodic intervals until the water temperature is at the desired point. During this period, any refuse matter is being dried or consumed. It can be readily seen that the stored water surrounding the incinerating chamber will keep a temperature high enough to greatly assist in rapid drying. It is also apparent that the heat of burning refuse will only be partly lost as much of it will find its way into the water tank.

The appliance is convenient for small charges of not over one day's accumulation of refuse, which automatically is consumed as water is drawn or heat is needed to offset standby losses. Its efficiency is less than the minimum water heater approval requirements which may offset its combined convenience.



Sectional View of Kernit Incinerator

The combustion of an incinerator with a full charge is complete and clean. No carbon monoxide is produced because of the provisions made for abnormal quantities of secondary air. The construction of the incinerator and the methods of insulating prevent a direct fire hazard from the appliance. The flue pipe may become a menace if much loose paper is burned while a heavy draft is occurring. If the appliance is installed so that no fixed inflammable building material is within 12 inches of the flue pipe, a fire hazard will not be ordinarily encountered. An interval clock gas valve shuts off the gas after a definite time which in many cases is sufficient to suitably reduce the refuse to a condition for self combustion.

In addition to the domestic uses of burning garbage, rubbish, etc., a gas incinerator is well adapted for destruction of bank and business records. Regulations in some States require that cancelled stock certificates, bonds and other documents be destroyed under very

rigid conditions by burning. These seem to be met by locking the loading door after a proper officer has supervised the loading and certifying to the examination of the ash that no unconsumed certificates remained. To make sure that all the material has burned a perforated screen must be installed in the flue to prevent lifting of unburned papers and blowing out through the chimney. Obviously this screen must be heat resistant and of sufficient free area to allow complete passage of incineration products.

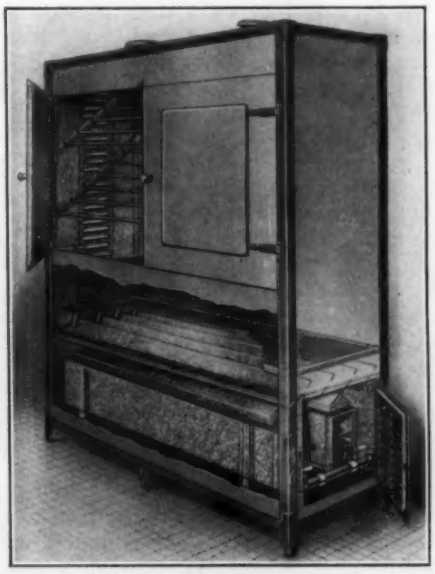
Incinerators are useful in doctor's and dentists' consulting rooms and in sections of hospitals to burn dressings and bandages.

Portable type incinerators should never be used for straight garbage disposal without some rubbish to lighten up the charge. "Stewing" and "coking" result and many failures can be attributed to such improper application.

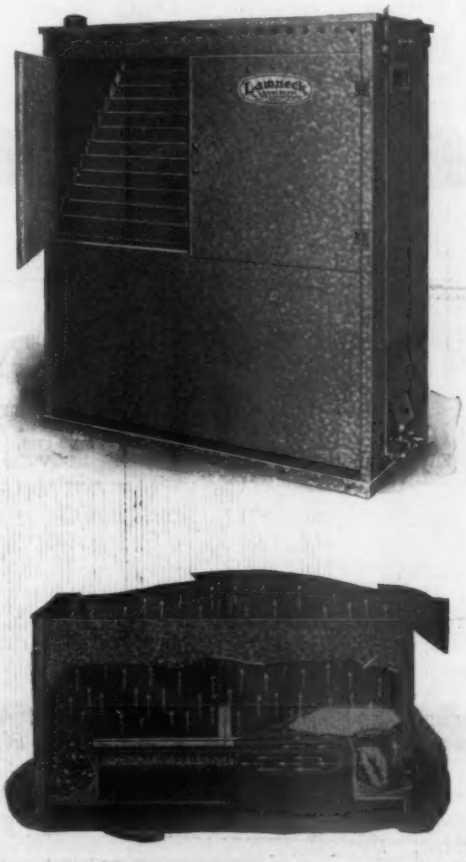
Properly applied and installed to give a good free draft above surrounding buildings, the incinerator is one of the health givers of the cellar.

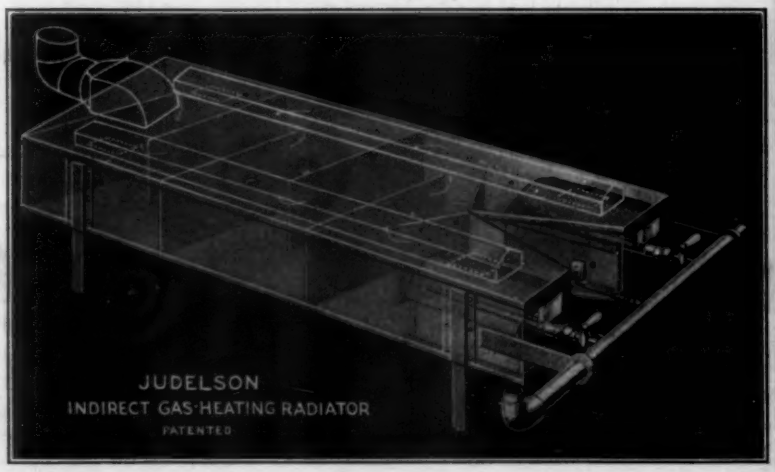
The Gas Laundry

The second health giver of the cellar is the gas laundry. Living conditions have changed since the days when each home was practically a small community in itself. In those days people lived on farms which in many cases were almost isolated from the rest of the general community. Hence, as necessity was the mother of invention, the families learned to depend on their own resources. All food was grown on the farm. Cloth was home spun and clothes were home made. In fact very few articles were obtained from outside sources. Fuel was particularly cheap, the farmer merely stepping out to his back yard and obtaining wood. Gas as an agent of speed, cleanliness, health and ease was unknown on the farms. All the household drudgery fell to the farmer's wife and her daughters. They were kept busy from early morning to late at night. Few were their pleasures.



Washing was done over a back breaking tub. Water had to be heated on a wood or coal stove and then carried to the tub, where it rapidly cooled, and had to be changed often. But the burden was not over, the clothes had to be taken to the yard and hung on the often soiled line. Carelessness in securing them to the line resulted in their blowing down to the ground and the necessity of rewashing. Sudden rain storms spoiled the work of a morning. The clothes finally dried, they had to be carefully gathered and the task of ironing began. Irons too hot scorched them or cooling suddenly, required many trips to the stove for hot ones.





Upper Left—Outside View Lamneck Dryer. Upper Right—Burner Detail of Lamneck Dryer. Upper Right—Judelson Dryer. Lower Right—Burner Detail of Judelson Dryer.

With the wider application of gas, manufacturers turned their attention to specialized equipment for off-peak gas use. The separate laundry stove for the clothes boiler joined the laundry tubs when these were moved to the cellar. It in turn has been replaced by the gas heated washer. There are several things which the gas washer is not

It is not a primary water heater. The self action or circulating tank heater is much superior in efficiency. It is, however, a booster to maintain and even slightly increase water temperatures during the washing process.

It is not a clothes boiler. Modern textiles, modern soaps and modern methods make boiling unnecessary.

It is not a new design of washer. It is an adjunct to a well designed and well operating mechanical washer.

Because of the many types of mechanical washers, description of these is not needed, the burner application, on the other hand is subject to many ideas. In most cases, this is a well designed ring or star burner heating the bottom of the washer tank. It is suitably guarded so that the machine is protected and also that flames will neither flash outside the frame nor overheat this and cause burns. In other cases, it is a miniature side arm heater, circulating the water and keeping up the water temperature.

The gas washer has the distinct advantage of maintaining hot water throughout the wash period which means cleaner, fresher clothes, free from soap spots produced by the suds cooling and depositing on the materials.

Percolator washers are built in two styles, a miniature bucket for use on the top burners of a gas range or laundry stove and a larger size complete with standard gas burner. The principle of washing is similar to that of other mechanical washers, removing dirt by passing soapy water at rather high rates through the cloth. In the mechanical washers, the agitator, or rotary blades or cups, or similar devices, cause the cloth to move through the water, but in the percolator washer, the fabric is held and the circulation of water causes it to flow through the material.

Driers

Batteries of clothes driers have been installed for years with an increase in sales depending on the activity in new apartment house construction. These driers were either steam or gas heated. With the heating plant of an apartment in operation, it was assumed that the steam for drying was merely the reclamation of a cheap waste. In the summer vacation, the demand for the central laundry facilities lessened and the more venturesome owners and progressive gas companies installed gas burners in place of the steam coils and found better and quicker drying resulting with greater satisfaction at apparently no increased cost. From this start the drier manufacturer listed gas heated batteries as standard equipment for apartment house use. These driers, of which thousands are annually installed, are built in as part of the building equipment and fit into the routine of housekeeping in apartment houses. These batteries are so constructed that the division walls between driers are light and serve merely as partitions instead of definite parts of the drier construction. As space is an important item, the racks pull out for loading and unloading. Bunsen type pipe burners suitably baffled and protected supply the heat for drying. No attempt is made, other than that of burner capacity, to limit or control the temperature. Extensions of the doors in front of the cock handles prevent the cock from being turned on unless the door is open and the operator is in position to light the burner. The space often allotted for driers is irregular, making a special battery the only possible solution. In adding this load the Architects or Builders Division can be of great service in specifying with the architect proper gas lines, take-offs and flues.

Designers of small homes desiring to economize on outdoor space used for domestic engineering purposes and enlarge gardens, found in the apartment house battery the germ of an idea to further their ends. The drier manufacturers were ready with the unit type portable appliances which are now even more familiar to the domestic salesman than the battery type.

Construction

The portable driers use two heating methods; direct, in which the drying compartment is a part of the combustion chamber and indirect, in which the combustion chamber is separate from the drying compartment. The direct drier has in its favor speed of drying and low fuel consumption. The indirect drier has the advantage of greater safety. Strings, laces and other delicate fabrics cannot come in contact with the flame and catch fire. In addition, in districts where gas is only partly purified continued exposure to flue products will in time cause disintegration of the fabric.

Driers are of the cabinet or rack type. In the former the drying compartment is a single space with doors opening on the long side. Loading and unloading is within the cabinet, except where the rods swing outside the drier.

The rack or so called "pull out" drier is made with two or three movable racks which pull out of the short end. The racks, closed at the front and back, produce a heat seal so that loading and unloading is done outside the drier and away from the heat of the drier.

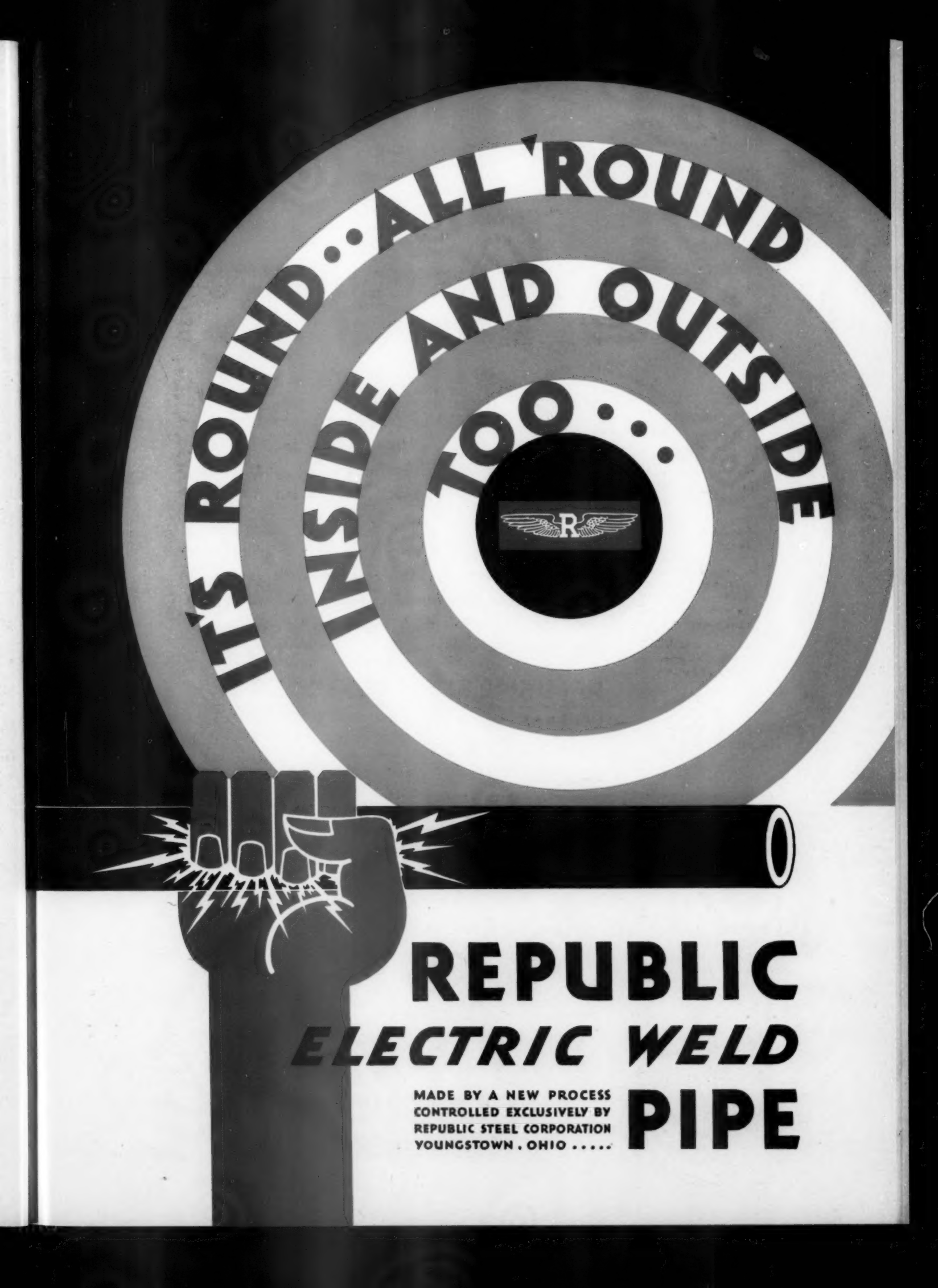
The cabinet drier can be installed in a space much shorter than that needed for the rack drier, making it especially adaptable for a short laundry, but the rack drier can comfortably be set in a deep narrow space, and is most desirable where many driers are installed in a community laundry.

Driers are usually equipped with drying rods having a linear capacity of 60 feet. These rods are always rust resisting, smooth and held in place by supports without sharp edges. In this way, the customer is assured of sufficient capacity for a big load and that the laundry will not be ripped, torn or marked by rust. The Approval Requirements prescribe a minimum variation in temperature between the different parts of the drying compartment. Barring a very uneven loading with many heavy bath towels and mats in one end and light silks and linens in the other, the entire load should dry at an equal rate. A protection screen is always placed between the drying compartment and combustion space. With the correct burner adjustment, it is possible to place light tissue paper on this screen without scorching.

Controls

All portable driers are now provided with limiting thermostats. The usual setting is between 200° and 250°F. which will maintain a safe drying condition at all times. A more serviceable control simply limits the temperature to 180°F., and then shuts off the gas to a pilot flame. For subsequent loads, the control is manually reset by a plunger. There are many advantages to such a control, the most important being the saving in

(*Continued on page 77*)


IT'S ROUND :: ALL 'ROUND
INSIDE AND OUTSIDE
TOO . . .
R
REPUBLIC
ELECTRIC WELD
MADE BY A NEW PROCESS
CONTROLLED EXCLUSIVELY BY
REPUBLIC STEEL CORPORATION
YOUNGSTOWN . OHIO . . . . .
PIPE

IT
MUST BE ROUND TO BE MECHANICALLY PERFECT

THE WELD
Guaranteed 100%.
Stronger than the parent metal.
No foreign metal added.
Perfectly smooth, inside and outside.

THE PIPE
Uniform wall thickness.
Perfectly round, inside and outside.
Scale and oxide removed, inside and outside.
Easy to weld and bend.
Lengths up to 50 feet.
Sizes, 4 to 16 inch.

PLANT CAPACITY
30 to 40 miles of pipe per day.

Every time quantities of pipe must be threaded—every time a gang is put to laying a line of pipe—every time a welder runs up against joints that won't butt—somebody says "Why doesn't someone make pipe that's round."

It's here—Republic Electric Weld Pipe. Not only round outside and exact to size, but also of uniform thickness, and thus round inside and of uniform bore. Briefly, its round all 'round, inside and outside, too,—it is truly a mechanically perfect pipe.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES: YOUNGSTOWN, OHIO

REPUBLIC
ELECTRIC WELD
PIPE

Health Givers of the Cellar

(Continued from page 74d)

fuel and elimination of supervision. With the control stopping the production of heat when the clothes are dried, baking and overheating are prevented with an increase in life of the fabrics.

Ironers

The gas heated ironer is available in many sizes and styles. There is an ironer from the size fitting on a washer in place of the wringer, up to a heavy duty ironer capable of ironing full size sheets and table cloths. Regardless of the size, a good ironer will have certain definite points of construction. First, there is simple control of the pressure between the roll and the heated shoe Because of the many materials to be ironed, the control of pressure will be simple and easily changed. Second, the burner capacity (Bunsen type) will be great enough to give the high finish on the first pass. Passing the fabric several times over a relatively cold shoe will give a soft dull appearance not at all in line with modern laundry requirements. Third, there is an even contact at all points between the roll and the heated shoe. Fourth, gas control cocks where flexible connections are used are always on the end of the solid iron house piping and no cocks are permitted on the ironer.

In addition to these basic rules other constructional details are added. A cover over the mechanism converts the ironer to a small kitchen table. Feeding and catch boards aid in keeping clothes from the floor. Automatic switches for pedal or knee operation are often added, all to the end that hands will be free for the most important duty of feeding clothes properly.

(The next article will deal with Gas Refrigeration)

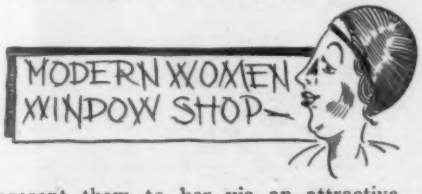
Merchandising Views and Reviews

WITH a cold wave working its way down upon these United States many motorists will again recall their many troubles of last winter and welcome the gas man who gets around with a plan to keep the garage cozy and warm. The Peoples Gas Light

For heating your GARAGE
You can do it better with GAS
Gas-Fired Garage Heater
BOOKLET FREE
The Peoples Gas Light and Coke Company.
122 South Michigan Avenue

and Coke Company advertisement reproduced on this page will give the gas man who is seeking to sell more gas per meter via the sale of garage heaters an idea of how one company makes an appeal to car owners.

DECEMBER, cold weather and Christmas! It's a good time to do your best with window displays. Modern Women window shop, and don't let any opportunity to interest her in your merchandise get-by. There are a number of new appliances that the home manager will want if you will but



present them to her via an attractive window display. Those small colored room or space heaters, with a few properties and some neatly lettered price cards will secure some heater business. A display featuring the gas heated laundry dryer, the new gas range or most any appliance you have will get business for you if properly displayed, especially at this season of the year.

ANOTHER advertisement that should cause a fellow to reach for a five spot is that of the Consumers Power Company. At this season of the year many are the men who are affected with morning sleeping sickness and a lack of hot water and while the Consumers have no cure for the former, they do show that the latter may be cured. This advertisement will appeal to the man who has to do the firemen dressing act and beat it to his office about twice a week without a shave, "Reach for a spigot instead of a match," is good and the man who produced this advertisement is clearly no novice in the matter of properly handling humor in advertising.

Reach for a Faucet instead of a Match! . . . . . .
NOW: "REACH FOR A FAUCET INSTEAD OF A MATCH!!"
Only $5 DOWN
Gives You Year 'Round Low-Cost Hot Water Comfort and Convenience
CONSUMERS SPECIAL GAS WATER HEATER
CONSUMERS POWER COMPANY

THE open display has at last invaded the appliance business. In any number of stores operated by gas and electric (combination) companies the open display table and case has been given a chance recently. These open displays of small items are said to speed-up the sale of larger appliances by bringing more people into the stores to shop and causing more people who enter these stores for the purpose of paying service bills to stop, look and listen to well informed sales people.

Open displays of such appliances as toastes, waffle irons, portable ovens, griddles, small stoves and a number of other items will aid the gas man to attract more people to his store and aid him to sell such appliances as incinerators, clothes dryers, and to demonstrate and tell folks about the new ranges, water heaters and space heaters.

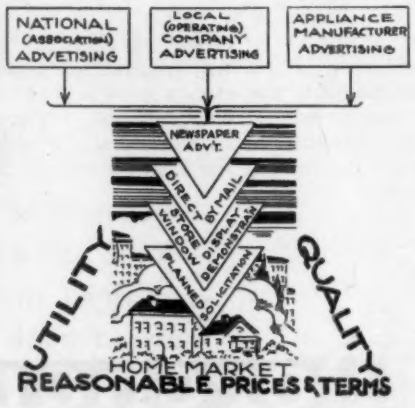
THE gas man who is developing plumber cooperation will be interested in the two photographs reproduced herewith. One shows how Wm. P. Gross, San Francisco, California plays-

up gas water heating in his display window, while the other portrays an exhibit built by Anthony P. Bovello, Washington, D.C., plumber. Both of these concerns are very active in the sale of gas appliances and we are told that the gas-man in both cities is responsible for their interest, and their very favorable attitude towards the gas company. That cooperative selling of gas appliances by the plumber, hardware, and other dealers may be secured, is attested by these photographs. They are but two of the thousands of plumbers who are now boosting the sale of gas through their active interest in the sale of approved lines of gas appliances.

THERE'S so much *how* stuff going around these days that a fellow has to do a double shift to keep up with it. However, when it comes to "Hows that help" to sell gas water heaters we count ourselves fortunate in that we have been able to uncover a number of them. One of the current publications of this type that we feel is particularly worth while is *The Rex Merchandiser*, a companion publication to *The Appliance Salesman*, published by the Cleveland Heater Company.

"ONE way to increase the sale of gas appliances and to secure the co-operation of other dealers in the sale of standard appliances is to build a merchandising plan that features UTILITY and QUALITY supported by reasonable prices and terms and that provides for a plan of advertising by the National Association, the local gas company and the manufacturer," said a man who has given the matter a great deal of thought. "You cannot hope to make merchants out of every man who has a desire to sell home appliances but you can enlist the co-operation of the better dealers if such a plan is devised. A plan of this kind put into operation would soon enlist the support of many good dealers in every community and inside of a year, if supported by a barrage of advertising directed at the home, would materially increase the sale of all appliances. Such a plan, too, would enable the gas company to put a great deal more time and thought into introducing the appliances that are needed in the home and which due to the fact that they have not been extensively advertised and promoted, have not the acceptance that they should have."

This is a brief way of expressing the idea that a great many men in the gas industry have had for years and which has proven successful in certain sections of the country. It is worth trying and developing.



THOSE gas companies around New York certainly know how to put their messages before the public via the newspaper advertisement. Just look at the one reproduced here! Who but this outfit would think to catalogue the whole line of uses for gas heating and show the heater that it takes to do the job, all in a single mass newspaper advertisement. *"The secret of efficiency consists in using the right implement for the right job"* in advertising a line of appliances.

For the right kind of Heat . . .

THE RIGHT KIND OF GAS HEATER

NOT so long ago we heard a man say; "There ain't no such thing as a gas washer." We did not dispute him for we were just a little hazy on the subject ourselves, but now, "Believe it or not," as Mr. Ripley would say, we know there *is* such an appliance. And aside from that, we know that one gas company, the Laclede Gas Light Company, has shown the old line washer dealers in St. Louis some new washer sales stunts and registered another blow to the blues singer who is chanting; "Folks are not buying."

To start the sale of washers, all decks were cleared, the advertising department worked out some sizeable advertising for use in the daily newspapers and Sid Riser cleared the floor of the main store and turned it into one big, bright display of washers. He also built a couple of advertising window displays that attracted thousands. One of these windows contained a background screen on which was painted a picture of a huge shoe in which were doors and windows. A placard told about "the old woman who lived in a shoe and had so many children she *did* know what to do." To be sure, she did her large washing with a washer that was equipped with a circulating gas water heater. The other window contained a similar screen on which was painted a picture of a lighthouse casting a bright beam across the turbulent sea. A large placard in this window stated; "For the Safe Washing of Your Intimate Things." In this window a mirror was placed at an angle over an open washer, which enabled people on the street to see the inside action of the disc in the tub of the washer.

As we view it, the manner, so unusual for a utility company, in which this drive was staged was responsible for its success. Note how the whole thing was set-up, just like they wanted the world to know;—no restraint as to price, down payment or Ten Year Service Guarantee; no sticking of the merchandise off in the corner, but just an honest-to-goodness big time sale of a gas washer with a drain tub thrown in.

Soup, Savings and Silent Salesmen

HYLAN PIPER

AND now we ask you; has salesmanship gone haywire? Doesn't it seem to be a fact that, by and large, a great deal of that thing so frequently referred to as native wit has sunk into a coma? And we ask you; where are those birds that created the two-car family, the home of automatic servants, the desire to keep up with the Joneses? Doesn't it look like it is about time to get these fellows out of the habit of "cystal-glasing?"

When we hear that both the cast iron and steel pipe manufacturers are hitting on all six; that a gas range manufacturer "hopes to fill most orders around Thanksgiving;" trat water heater, refrigerator, incinerator and other manufacturers of gas appliances have had a "wonderful year," we are forced to believe that there is some business to be had. Yet generally, the old sickness we spoke of last month seems to persist.

When reviewing these reports with a level headed executive at lunch a few days ago the question was asked; "If it is a fact that thousands of new gas customers are being added to our distribution systems each month, why are so many gas men wearing blue glasses?"

"Well," came the reply, "things went pretty well for the gas men during the boom times, following the war. And due to the vast number of new homes created and the fact that a great buying wave was in force during 1919 and early 1920, the gas man was able to ride the waves over the slight depression that followed late that year. He was in fine shape for the good days that followed. Those effortless days softened him and when some one told him that 'he did not look so good,' last October, he took it to heart

and 1930 found him a sick man, a silent salesman,—and there aint any such animal."

The home appliance salesman completely forgotten of his own volition or, by reason that his superior shelved his sales plans, that folks still had a desire to keep-up with the Joneses. Sales forces were pared, one man being assigned to as high as three thousand meters (customers), and in some instances sales territories were broadened to the extent that "the customer was wild" and become anyone's game. Advertising appropriations were given the air and, as we have said before, salesmanship went below par.

It's time to cut the howling and call in old man sociology.

In the October issue of this magazine we dwelt at length on what happened to a great many men of the appliance industry. We told how some of them had been talked sick and how some others had given salesmanship all they had and made good.

Since that article appeared we have been asked, "When will the tide turn?" Our answer was, "We do not know, but you may rest assured, not until salesmanship struts its old stuff." It is our opinion that with the large per cent of America's population stuffing their coin into savings accounts and swelling insurance funds, there is sufficient business to be had by the plugger to make plugging worth while. We believe that the more salesmanship is employed the greater will be sales and employment. Demands upon retailers create demands upon wholesalers and in turn upon producers of raw material, transportation and what have you. Pay days produce purchasing agents with the ability to spend. In other words, selling will speed-up spending in all lines—and spending will speed-up employment.

Again, what the United States needs most of all today is a going brand of salesmanship; salesmanship that has sensed, met and overcome the changed conditions that exist the world over; the brand of salesmanship that understands that transportation is on the wing, high speed; that the kitchen is more than a hot stove; that cleanliness is a necessity, a health measure; that incineration of waste material and garbage is an insurance; that clean heat produces health and happiness; that the new prevails and that salesmanship must get out or get in to the doledrums.

Anyone who cares to conduct a private investigation may uncover any number of salesmen of home appliances that are making a go of it; salesmen who are making good records and money, despite all the talk that is going the rounds to the effect that "people have no money to buy." However, it must be said these men are using a modern approach and appeal; they are sticking a bit closer to the customer and not taking to pee-wee golf under cover.

These men have proven that selling will sell.

There have been any number of new homes created since last October; countless new appliances have appeared on the market; many others have been given a new dress and thousands and thousands of appliances that were old last October, (1929) and that are now ancient, are taking up good space waiting for a salesman to sell their owners a modern job.

Business will start up grade when salesmanship meets and overcomes new sales conditions.

Gas men are familiar with the reports that are going around; tales of tested plans that are to be spread over three-year periods to sell electric refrigeration; plans that call for the expenditures of millions in promotional ideas to capture the cooking load; plans that will electrify the clock; plans that call for courting the hardware jobber and dealer and teaching him how to help build the k.w.h. load.

These men are not "cystal-glasing" they are not making much noise but they are using salesmanship to make the domestic meter pay its way.

It's up to salesmanship to stop the creation of soup kitchens, to get some of the savings into circulation and to come out of its silence.

Gas Company Ties in With Big Los Angeles Christmas Campaign

W. B. STODDARD

ONE of the greatest and most comprehensive campaigns for creating early, a strong Christmas shopping spirit, and a spreading out of the holiday buying over a longer period, was carried to a most successful conclusion in Los Angeles last season, under the auspices of the leading business associations of the down town district. After an exhaustive survey of the situation, the Central Committee decided that the cost of the undertaking, including street lighting and decorations, floats and costumes for the parade, stationery, printed publicity, etc., would approximate $100,000. Of this amount the merchants contributed $40,000, while the property owners, real estate, utility, banking, hotel and other interests furnished $60,000.

About the middle of October the committee mailed 500,000 notices, printed in four colors, to homes in Los Angeles and neighboring towns, telling of the wonders soon to be seen in the stores and on the streets, and urging an early inspection, and likewise "To not delay, but lay away, a gift each day for Christmas." For the benefit of the children the big Christmas parade was also played up in an enticing manner.

On Saturday, November 2, occurred the first distinct novelty—the arrival of the Merry Workers. These were youths of about 16, dressed in bright colors, with ruddy cheeks and white pointed beards, after the popular conception of Santa Claus' helpers. They mingled

(*Continued on page 82*)

GLOVER-WEST VERTICAL RETORTS

Other Glover-West Installations

Fitchburg, Mass.
Springfield, Mass.
Portland, Maine
Ottawa, Ont.
Vancouver, B. C
Victoria, B. C.
Watertown, N. Y.
Malden, Mass.
Fargo, N. D.
Toronto, Ont.
Guelph, Ont.
Santos, S. America
Pernambuco, S. Amer.
Buenos Aires, S. Amer.
Fall River, Mass.
Faribault, Minn.
Halifax, N. S.
Belleville, Ont.
Rio de Janeiro, S. America

PAWTUCKET GAS COMPANY—PAWTUCKET, R. I. Engineers—STONE & WEBSTER ENGR. CORP.

Three Glover-West Installations at this plant - - - - the third started producing gas in August

The first installation of Glover-West Vertical Retorts at Pawtucket was made in 1913, the second in 1927, and the third in 1930. When a gas company orders three consecutive installations—that conclusively indicates complete satisfaction with the low production and maintenance costs and the flexibility in operation of the system installed. It might be added that, due to the continuous improvement in design and construction of Glover-West Retorts the third extension was made without increasing the original plant area.

West Gas Improvement Company

Builders of Coal Gas Plants

441 Lexington Avenue New York, N.Y.

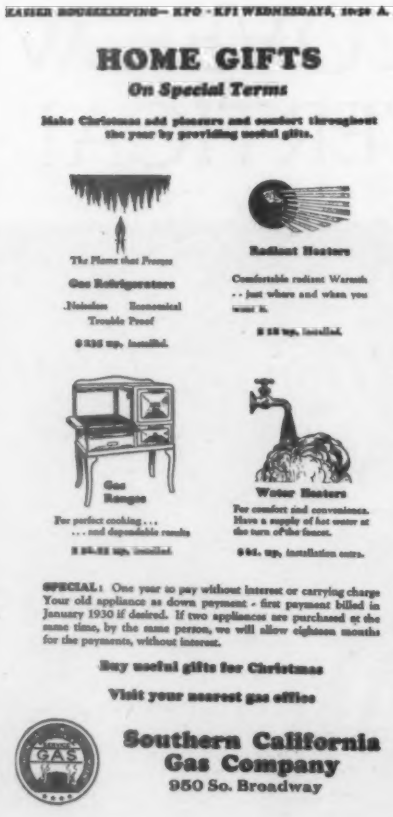
Gas Company Ties in With Christmas Campaign

(*Continued from page 80*)

with the crowds on the streets, singing Christmas carols. At ten o'clock they separated into groups, going to the different places of business, where they remained all day greeting patrons and calling attention to new gift lines. Each firm hired its own corps of Merry Workers, costumes for whom were supplied at cost. The old Christie motion picture studios were taken over as headquarters by the Central Committee, and all desiring work as Merry Workers registered there and were sent out to the various places, in the number desired, by the committee.

All firms unveiled their windows at the same time—7:00 P. M., November 14, due notice of same being given in the newspapers. Crowds were on hand to see the event, and heralds stationed at all the chief intersections gave the signal with trumpets. There was an official inspection of the windows by the mayor and city council, and an unofficial inspection of the several miles of displays by the crowds until almost midnight. Similarly, all interior decorations were in place on the morning of November 15, and the concerted appearance of these symbols of Christmas greatly increased the holiday shopping urge. The only event that did not take place on schedule time was the completion of the street decorations. They were so massive, and of such a comprehensive nature, that although men worked steadily on them for three weeks, they were not completed until just before the big parade on Thanksgiving Day. There were 120 castles, covered with snow, each 20 feet high, placed atop the electric light standards at all the principal corners in the shopping district. In these were broad casting horns, and by means of powerful amplifiers, music—Christmas carols chiefly, was wafted from them out upon the air above the din of the city traffic at regular intervals, from November 28 to December 31. Arches twined with greenery, and decked with flags, banners and colored lights were placed across the streets in the middle of the block, and over all the principal street intersections. On Thanksgiving morning ocurred the event that all had been anticipating for weeks—the gorgeous glittering Christmas parade. It had been talked of in the papers, blazoned on billboards, flashed upon the screen, and announced by cards in the many places of business, and accordingly thousands from nearby towns as well as all of Greater Los Angeles flocked to the shopping district to see it. There were ten gorgeous floats, depicting story book characters known to every child, nine bands, groups of grotesques, and funny animals, the whole consuming an hour in passing.

Special Christmas section, freely illustrated, were run in the newspapers on two different occasions. Each section consisted of eight pages, and contained news stories and alluring Christmas



ads. Business men united in declaring the campaign a big success, and W. Ross Campbell, who directed the financing program, summed up the result in a few words: "The Los Angeles Christmas Campaign will go down as a genuine achievement in community celebrations for the little ones, and will be a propitious stimulant to trade throughout the city generally."

The Gas company and all firms handling gas appliances of course tied in with the campaign, and put forth some beautiful displays. The Southern California Gas Co., commenced advertising very early in the season, stressing "Buy useful gifts for Christmas—Visit your nearest Gas Office." Knowing that a picture gives more ideas of an appliance than reams of description, they used cuts freely in their ads, illustrating, pricing and describing their gas refrigerator, radient heaters, water heaters, gas ranges, etc. They made very liberal offers, including acceptance of an old appliance as part payment, and a year to pay without interest or carrying charges. When two appliances were purchased they offered 18 months to pay. A decidedly holiday appearance was given to the main office and sales room by means of small white Christmas trees, set upon the counters at frequent intervals. In the lobby a big Christmas tree, loaded down with tinsel and ornaments attracted much attention. Their window featured "Modern Christmas Gifts." It was backed with a silver screen, upon which was hung a huge green wreath, and inside this, in silver letters on a back ground was the suggestion "Modern Christmas Gifts."

An up to date gas range and radient heater were shown and two large silver cards, with borders of black and green advised:

For Christmas a modern

GAS RANGE
RADIENT HEATER
GAS REFRIGERATOR

Your old appliances may be traded in on one of these conveniences.

The other stated their offer of 12 months to pay, or 18 months where two appliances were bought, without interest.

The Broadway showed a white enamel gas range, enclosed in a huge green cardboard wreath; and a card on an easel, adorned with a big red candle with the announcement:

SPECIAL CHRISTMAS OFFER:

$15.00 allowed for your old stove. This is our special offer, for one week only, to every purchaser of a Tappan Gas Range

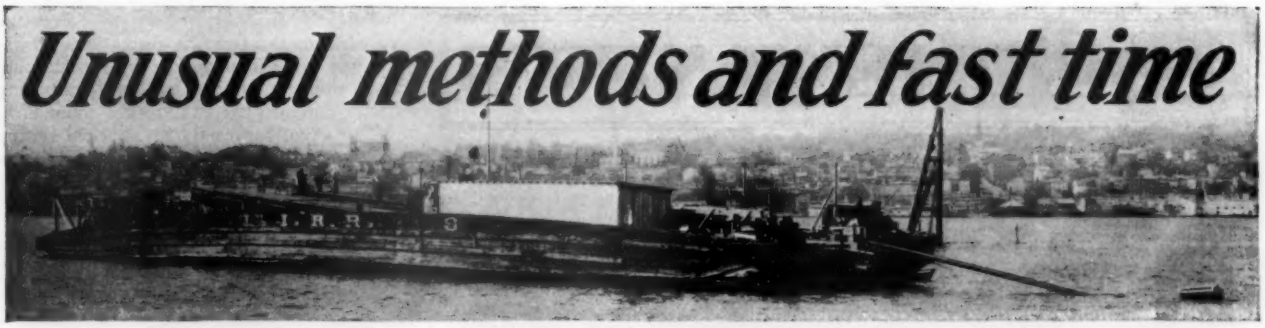
Natural Gas for Central Indiana

The Central Public Service Corporation of Chicago has made final arrangements for the production of natural gas in southeastern Kentucky and is now making plans for the transporting of natural gas to central Indiana. Through one of the subsidiary companies, Central Natural Gas Corporation, the corporation has contracted with the Kentucky-West Virginia Gas Company for the operation of a large tract of gas yielding land in Kentucky, from which location the gas will be supplied to the central Indiana and other markets.

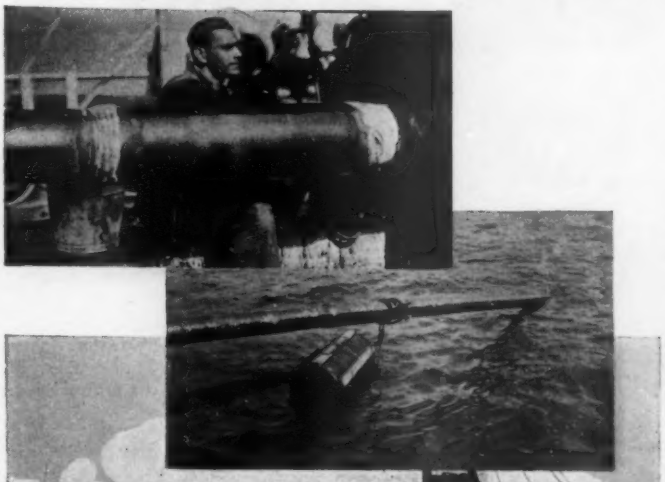
This project has just been started. The Central Natural Gas Corporation has obtained offices in the Guaranty Bank & Trust Company building in Lexington, Ky., for the direction of the work. Since their occupancy of these offices on August 15, gas well locations have been made in the producing area and construction plans have been started for the building of the main gas line. Actual drilling operations of a few wells were started October 1.

Approximately 100 wells are to be drilled and 1,500,000 feet of 18-inch pipe are to be laid. Thousands of tons of pipe will be required for the main gas line alone, including 700 carloads of steel pipe and 80 carloads of pipe couplings. In addition to this material, at least 250,000 feet of pipe for casing the wells will be needed. It is estimated now that the material and the labor to install it will represent an expenditure of approximately $12,000,000.

All of the engineering plans for the work are being made by the Central Natural Gas Company at their Lexington offices. The execution of the plans will likewise be made by this company.



Unusual methods and fast time feature laying of high pressure Gas Line across Hudson River



INTERESTING and unusual construction methods were used in laying this high pressure gas line across the Hudson River between Beacon and Newburgh, New York, for the Central Hudson Gas & Electric Corporation.

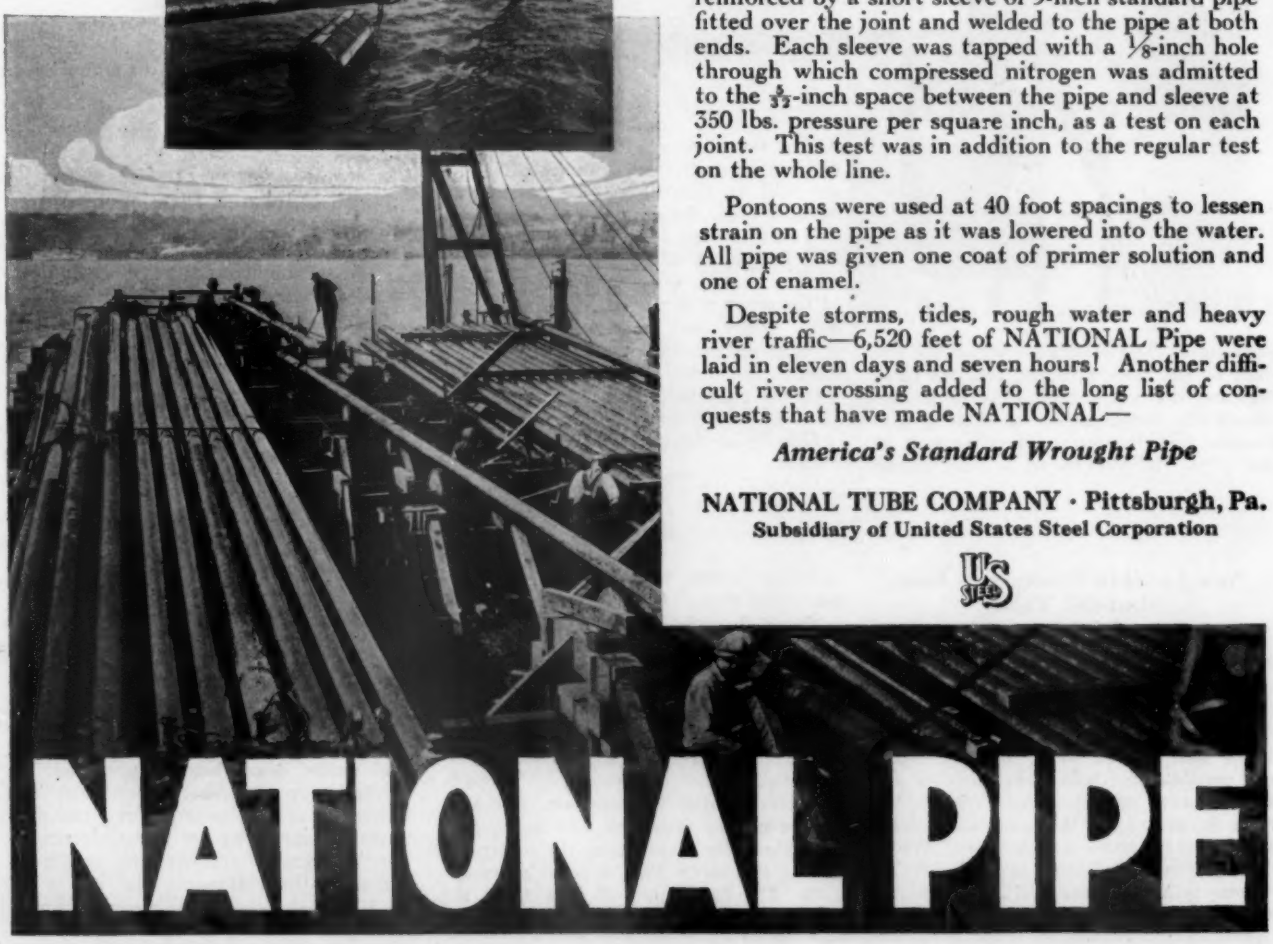
The 8-inch extra strong pipe in 40-foot lengths was butt-welded together and handled in 80-foot units. The type of joint used for the line was specially designed and developed by T. A. Corby, Central Hudson Gas & Electric Corporation, and patent applied for. It consists of a butt-weld joint reinforced by a short sleeve of 9-inch standard pipe fitted over the joint and welded to the pipe at both ends. Each sleeve was tapped with a $\frac{1}{8}$-inch hole through which compressed nitrogen was admitted to the $\frac{5}{32}$-inch space between the pipe and sleeve at 350 lbs. pressure per square inch, as a test on each joint. This test was in addition to the regular test on the whole line.

Pontoons were used at 40 foot spacings to lessen strain on the pipe as it was lowered into the water. All pipe was given one coat of primer solution and one of enamel.

Despite storms, tides, rough water and heavy river traffic—6,520 feet of NATIONAL Pipe were laid in eleven days and seven hours! Another difficult river crossing added to the long list of conquests that have made NATIONAL—

America's Standard Wrought Pipe

NATIONAL TUBE COMPANY · Pittsburgh, Pa.
Subsidiary of United States Steel Corporation



EQUIPMENT NEWS

A New Time Control for Range Top Burners and Ovens

The Dun-Rite Clock Company, 1893 Amsterdam Avenue, New York, are placing on the market a new time control for gas ranges. The illustration shows the two dials on the clock face and also the small regulator dial at the right. The device automatically turns gas on and off in connection with the top burners as well as the oven. It consists of a time telling clock, a separate indicating dial and distributing valve, which valve is opened and closed by the clock and a safety pilot with thermostatic master valve.

The clock has two patented alarm dials with an hour and minute hand on each dial which gives accurate minute settings and acts as the regular kitchen clock, as well as the valve operator. The indicating dial can be positioned to indicate that the gas will be turned off and on the top burners only, the oven only or both top and oven burners as desired. The manual and automatic valves and parts do not conflict as each is operated independently of the other with the gas entering a common orifice and mixing chamber, but through different leads. The thermostatic master valve will close automatically in case the pilot light goes out, and cut off all gas to every part of the stove.

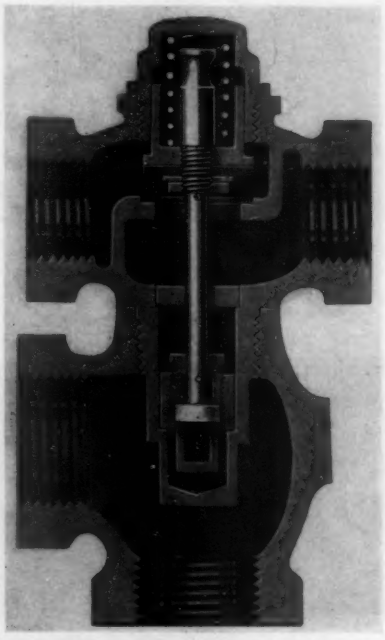
Descriptive literature will be mailed on request.

New Lovekin Emergency Gas Shut-Off Valve

The Kitson Company, 261 North Broad St., Philadelphia, Pa., recently issued a bulletin announcing the new Lovekin Emergency Gas Shut-Off Valve. The Lovekin Valve is a positive acting emergency gas shut-off valve for preventing any possibility of boiler explosion of gas water heaters of the storage type. This valve is placed on the cold water inlet as close to the boiler as convenient. While the water is being heated in the boiler, its volume is being increased. This results in a movement of the hot water past the cartridge holder which contains the fusible metal disc.

Sectional view of the valve is shown. The metal disc is located at the bottom of the piston and is in a water-tight compartment. The safety feature of this valve is that if for any reason the thermostat does not shut off the gas when the temperature is reached to which the thermostat is set, instantly the Lovekin emergency valve will operate and shut off the gas so that there can be no possibility of the pressure in the boiler becoming sufficiently high to cause an explosion. The conduction of heat from the water to the fusible disc softens the disc sufficiently for the spring to force the valve stem through the disc. This closes the gas valve immediately with a snap action, shutting off the gas and preventing backfiring into the gas mixing chamber.

The valve can easily be attached to any type of storage hot water heater. It is the invention of Luther D. Lovekin, M. E., who is recognized as an authority on such devices.



Hand Operated Pipe Wrapping Machine

Johns-Manville and the W-K-M Company have developed a field machine, which travels on the pipe, is easy to operate and it is stated does a uniformly high-grade job of wrapping at the rate of 15 lineal feet per minute. This machine has long since passed the experimental stage and many hundred miles of 4-inch, 8", 10", 16" and 20" pipe have been successfully wrapped with this piece of equipment.

The machine it is claimed not only gives a far better, tighter job with a uniform lap not obtained by hand wrapping, but it does it much faster and at considerably less cost. The wrapping of a mile to a mile and a half of pipe per day is readily possible—with only two pairs of men alternating at the machine.

Briefly the machine consists of circular angle-frames carrying a roll of felt, the entire load being supported on spring mounted rubber rollers with ball bearings. These rollers serve the purposes of supporting the frame, determining the travel of the machine, and ironing out all wrinkles in the felt as it

(*Continued on page 86*)

Superior Meters

"All that the name implies"

— Based on Quality —

Bounded by Economy and Service

SUPERIOR METER COMPANY

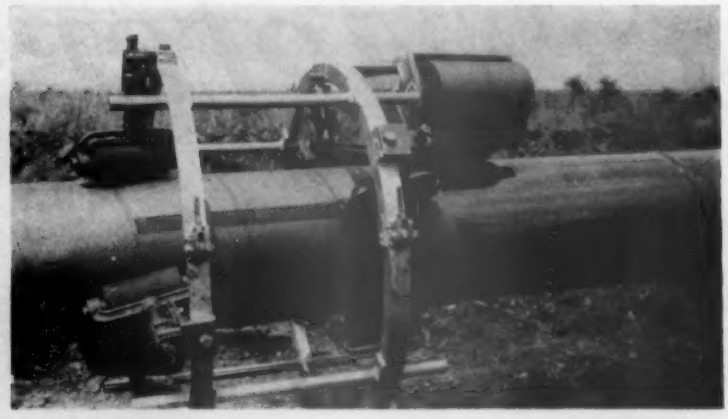
BUSH TERMINAL BLDG. NO. 20

BROOKLYN, NEW YORK

Equipment News

(*Continued from page 84*)

is wrapped on the pipe. They are located so that they ride only on the wrapped part of the pipe. Not one of them touches the bituminous coating ahead.



The machine can be readily and quickly put on or taken off the line as the frame is split and hinged for disassembling. It weighs approximately 400 pounds complete and is easily operated by a two-man crew. The felt is usually applied with a one-inch lap, and the machine progresses at the rate of fifteen feet per minute.

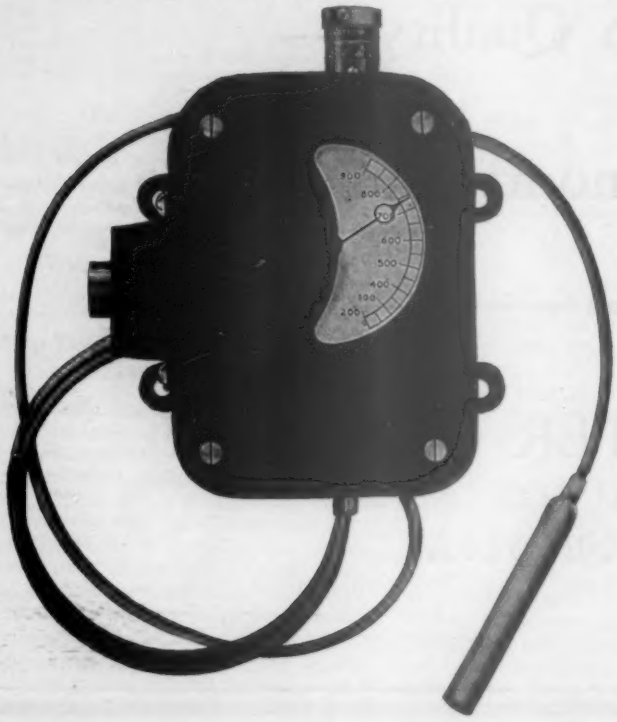
It is customary to have one machine for every line gang, usually one to every fifty mile section to be wrapped. This machine wraps a bonded or an unbonded job with equal facility.

When a bonded job is to be done, the pipe wrapping machine follows closely behind the application of the hot bitumen while the latter is still fluid.

If a high melting point enamel is used for the coating and an unbonded felt wrapping is used to protect it, the Asbestos Felt is machine wrapped as soon as the enamel has hardened. The same procedure is followed if a cold asphalt paint or grease compound is used for the coating. If an emulsified asphalt coating is to be protected by an asbestos wrapping, it is necessary to await the initial dehydration of the emulsion before applying the felt.

Further details may be obtained by writing Johns-Manville Corporation, 292 Madison Ave., New York City.

New Universal Contactor for Indicating Temperatures



The Partlow Corporation, New Hartford, New York, recently issued a catalog describing their line of temperature controls, safety gas valves and pilots. The illustration shows the Partlow Universal Contactor for indicating temperatures and controlling flow of gas.

This instrument functions as a thermostat and has a calibrated indicating dial which may be set to any pre-determined temperature within its range.

It embodies the three-wire thermostat control principle; using standard mercury actuated flexible elements.

The element is installed in the oven, furnace or other apparatus of which it is required to control the temperature. As the temperature in the oven or other apparatus rises to the pre-determined degree, a contact is made which stops the flow of heating medium to the appliance again. This automatic opening and closing of electrically operated valves, relays and solenoids, decreases or increases the supply of heating medium; thus resulting in holding an accurate and even temperature. It is used on ovens, metal pots, circulating fans in ovens, ventilating systems, air dryers, etc. Number 1 Contactor is used to accomplish automatic control of temperatures between 50 and 350°....and a Number 9 Contactor between 200 and 900° F.

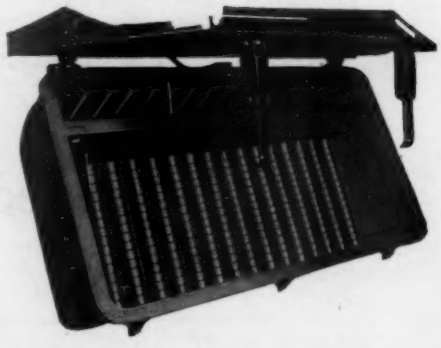
Copy of catalog will be mailed on request.

New Gas Unit Heater

The Buffalo Forge Co., Buffalo, New York recently issued Bulletin No. 2754 describing their new Buffalo Gas Unit Heater, which is designed to furnish heat for industrial plants.

The heat interchanging element consists of brass tubes arranged in staggered rows. Louvers in the discharge opening are adjustable to deflect the air where desired. The fan is an especially quiet running unit without mechanical vibration. The air delivery is 2300 cubic feet of air per minute.

The gas burner consists of tubes, each with its own orifice mixer. This insures even distribution of gas to the burners and uniform heat to the flue tubes. The amount of gas consumed can be controlled by an adjusting screw on gas valve.



A variation of 50,000 to 150,000 B. T. U. can be made in this manner.

Illustration shows burner pan dropped. Copy of Bulletin will be sent on request.

Seek Authority to Increase Rates

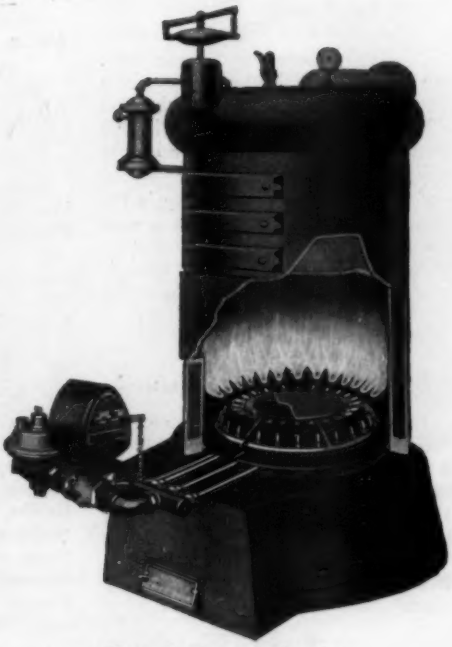
The Indiana public service commission has received a petition from the Central Fuel Company asking for authority to increase gas rates at Rushville, Ind. The present rate is 50 cents a 1,000 cubic feet. No definite amount of increase was petitioned.

PUT A BARBER BURNER IN YOUR OWN FURNACE OR BOILER —NOW!

WHAT gas company officer or employee has no radio in his home? No washing machine? No vacuum cleaner? No modern bathroom? And yet how many are there still burning coal in their furnaces and boilers when they might be enjoying the modern comfort of automatic gas heat!

We recommend a little campaign to your own organization, to make gas heat enthusiasts and salesmen out of all those whose business is gas. Have them see for themselves the sound economy of heating with gas with a BARBER Automatic Gas Burner. Let them prove to their own satisfaction that the BARBER twin-flame does generate greater heat than ordinary mixer type burners and by properly applying the flame directly to heating surfaces at the proper level of furnace or boiler does produce the highest possible efficiency—with less gas.

With new list prices as low as $72.50 for complete BARBER Automatics, almost everyone can now afford a BARBER Automatic Burner, especially since it is easily installed in the coal furnaces or boilers already in use.



Note how correctly the BARBER Burner fits into a standard boiler, so located to drive its flame in a "scrubbing" action directly against the side walls — at the proper level. It is made to fit square or rectangular boilers with equal accuracy.

Load building, like charity, may as well begin at home. But the valuable result will be to make salesmen for gas heat with BARBER Burners out of everybody in your organization. Write for our new sales helps, catalog and literature containing full and complete information on BARBER Conversion Gas Burners.

BARBER Automatic Conversion Gas Burner Assembly made of 6 No. U-17 units, for installation in sectional boiler. Such assemblies made to fit any size or shape of boiler or furnace.

BARBER *Automatic* JET GAS BURNERS

THE BARBER GAS BURNER CO., 3702-4 SUPERIOR AVE., CLEVELAND, OHIO

FORMERLY THE CLEVELAND GAS BURNER & APPLIANCE CO.

NEWS OF THE GAS INDUSTRY

Del Rio Domestic Natural Gas System Operating

Del Rio, Texas, is enjoying gas service for the first time as a result of the turning of natural gas into the mains of its recently completed domestic distribution system, according to announcement made by Texas Utilities Company, subsidiary of Appalachian Gas Corporation.

Gas is brought from the Rycade field, fifty-two miles away, through a 10¾-inch high-pressure line completed in July, this line being unique insofar as it is the first natural gas pipeline ever to be laid in sixty-foot lengths.

One of the sources of gas supply is the noted Chittim Well No. 3, having a rock pressure of 2,100 pounds per square inch. This well has an estimated open flow of approximately 11,000,000 cubic feet daily.

New Butane Gas Plant Opened

The new Aiken, S. C. butane gas plant of the Georgia Public Utilities Company has just been formally opened for use. The plant operates at 550 BTU, and the system covers approximately 70,000 feet of gas mains. It will be under the direction of the Augusta, Ga., branch of the company, and owned by the Central Public Service System.

To Build Gas Plants

Construction of several new gas plants in Wisconsin cities at a cost of over a million dollars is being started by the Utilities Gas and Electric Co., it was announced by Byron T. Gifford, president. The work will give needed employment to about 1,600 men.

Cities in which the new work is being done are Tomah, Waupaca, and plans tures in New London, Prairie du Chien, Viroqua and Richland Center, on which work will start next spring.

United Gas to Build Tie-In

Approximately $5,000 will be spent by the United Gas Company of Texas for improved service in Beaumont as a part of a $20,000,000 expansion program. The expenditure in Beaumont will be for a tie-in between the Dixie Gulf Gas Company and the Magnolia corporation. This will provide another loop through which natural gas can be brought to Beaumont from the northeast Louisiana gas fields.

The other loop brings natural gas from the East Texas gas fields. Of the $20,000,000 to be spent in expansion, the sum of $8,500,000 for transmission and distribution facilities has already been authorized.

Four More Southern Gas Companies to Use Natural Gas

Four important Southern gas companies have just been "cut in" on natural gas and will use it in the future.

They are the Macon Gas Company, of Macon, Ga.; the Alabama Utilities Service Company, supplying gas to Montgomery and Selma, Ala.; the Mobile Gas Company, of Mobile, Ala., and the Georgia Public Utilities Company, supplying gas to Griffin, Ga.

In addition to these, natural gas is soon to be turned on in Pensacola, Fla., which will be the first Florida city to receive it.

Cities in the Southeast now served by the Southern Cities Public Service Company now include Anniston, Gadsden, Mobile and Montgomery, Alabama; Atlanta, Griffin, Macon and Rome, Ga., and Hattiesburg and Meridian, Mississippi; while those served by the Georgia Natural Gas Company include Carrollton, Cedartown, Forsyth, Milledgeville, Newnan and Rockmart, Ga.

In addition, quite a number of smaller cities in Mississippi, Alabama and Georgia are being served by natural gas.

Butane Gas Plant For Gainesville, Ga.

Construction of a butane gas plant will be started at Gainsville, Ga., at once, it is announced. The plant, which is one of twelve being constructed by the Utilities Gas and Electric Company, of New York, at a cost of more than $1,200,000, will be completed inside of a year, it is stated. Other Southern cities where butane plants will soon be under construction by the company include Fulton, Ky., and Murfreesboro, She'byville and Union City, Tenn.

Uniform Rules Sought for Gas Meter Tests

Regulations for the testing of gas meters, which have been in force in New York City, will be extended through the entire State, according to plans of the Public Service Commission, disclosed in a statement Oct. 25 by Milo R. Maltbie, a member of the Commission.

"The adoption of standard regulations, which shall apply to every company within the State, will correct any instances where gas meters are running too fast and will thereby protect every gas consumer in the State against the possibility of paying for more gas than is actually used," Mr. Maltbie said.

"In order to give the companies an opportunity to be heard upon the proposed standard regulations for meter testing," he continued, "the Commission has fixed a hearing to be held Nov. 19 at its offices in the State office building at Albany."

File Articles of Incorporation

Articles of incorporation have been filed with the secretary of state of Indiana by the Inter-City Gas Corporation having a principal place of business in Corydon, Ind. The corporation has an initial capital stock of 1,000 shares having no par value and is formed to drill for gas and market and distribute the same. The first board of directors is composed of M. A. Maroney, Albert H. Murphy and R. M. Johnson.

The William Dean Jr., Oil and Gas Corporation also has filed incorporation papers, it being the purpose to drill gas wells and build pipe lines. It has an office at Terre Haute, Ind., and the directors are Joseph A. Friz, Donna Dean, Abraham S. Levin, Abe Rosenfeld, Paul Plost and Earl R. Dean, all of Terre Haute.

Announce Consolidation of Gas Companies

Consolidation of Highland Gas Company and East Penn Gas Light Company with Allentown-Bethlehem Gas Company has been approved by the Public Service Commission of Pennsylvania.

Announcement of this action was made recently by John A. Frick, president of the Allentown-Bethlehem Company.

Convention Calendar

December

9-12 Tenth Annual Gas Meter Short Course and Conference, under joint auspices of the Mid-West Gas Association and Iowa State College, Ames, Iowa.
R. L. Klar, Mid-West Gas Associatio, Sioux City, Iowa, Chairman.

February

3-5 New England Gas Association, annual convention, Hotel Statler, Boston, Mass. C. D. Williams, executive secretary, 41 Mount Vernon St., Boston.

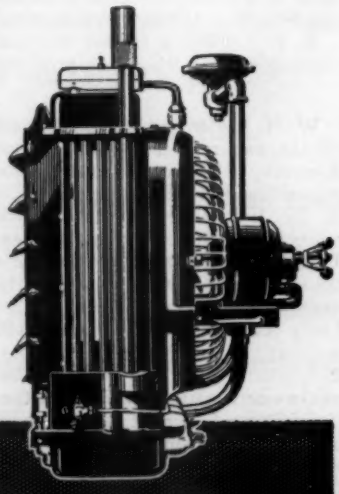
. . . Humphrey Gas Unit Heaters Provide Instantaneous Adaptable Heat for the Municipal Pier at St. Petersburg, Fla.

Realizing the importance of providing heat during even cold days or nights of that southern section, the management of the Municipal Pier at St. Petersburg, Florida, installed Humphrey Gas Unit Heaters. As a result heat is available at an instant's notice.

Humphrey Gas Unit Heaters burn gas in the most efficient manner. Their increasing use is opening a new era in industrial heating. The continually profitable service they render in factory, store, garage or public building widens the opportunity for increased sales of gas—more satisfied customers for gas companies. Write for descriptive catalog.

GENERAL GAS LIGHT CO., KALAMAZOO, MICHIGAN
New York - Pittsburgh - Cleveland - San Francisco

Seventeen Humphrey Gas Unit Heaters, installed in the Municipal Pier, *insure dependable heat when needed.* They are thermostatically controlled, therefore no operating attention is necessary. And being suspended from the ceiling valuable floor space can be utilized for other purposes.



The Humphrey Gas UNIT HEATER

PERSONALS

M. E. Skinner, Chairman of Merchandising Committee, Niagara Hudson Power Corporation, moved his offices on October 6th from Albany to the Electrical Building, Buffalo, Niagara and Eastern Power Corporation at Buffalo. Here he will continue as head of the Committee with its state-wide activities in merchandising promotion for the Niagara Hudson system.

Mr. Skinner joined the Mohawk Hudson Power Corporation at Albany, as Commercial Manager, in May, 1927 and in October, 1927 was appointed Vice President and Commercial Manager of New York Power and Light Corporation. Both companies are now subsidiaries of Niagara Hudson.

He came to Albany from the Duquesne Light Company, Pittsburgh, Pa., of which he was Commercial Manager.

Ottis E. Barene, having been connected with the gas industry for the last five years or more, is now in the employ of the Brooklyn Borough Gas Company at Coney Island, N. Y., in charge of the House Heating Division.

He was formerly connected with the Pavilion Natural Gas Company of Pavilion, and the Westchester Lighting Company, both of New York State.

James C. DeLong, for many years president of the Syracuse Lighting Company, Inc., Syracuse, N. Y., recently retired as president to become chairman of the Board of Directors at Syracuse.

A. D. Dudley, a former vice-president, succeeded Mr. DeLong as president.

W. H. Sadler has been named manager of the public information department of Kentucky Utilities Company, Louisville, succeeding John E. Davis, now in Buffalo, N. Y. Mr. Sadler came to Kentucky four years ago in the employ of the Associated Press. For the past two years, he was on the staff of the Courier-Journal. He began newspaper work with the Topeka, Kans., Daily Capital, and has associated with publications in Memphis, Kansas City, Fort Smith, Ark., and other southern and mid-western cities. While with the Associated Press, he served in bureaus throughout the south, coming to Louisville from Atlanta, Ga. He is a native of Logan County, Arkansas.

W. E. Robbins, for the past six years the General Auditor of the Southern California Gas Co., has just been appointed Treasurer of the Company. The position of Auditor has been filled by advancing George A. Detrick, who has held the post of Chief Traveling Auditor.

Mr. Robbins, a native of Illinois, received his early education in Indiana, and came to California twenty-three years ago. After being connected with several important organizations here, he was employed by Stone & Webster during their development of Big Creek for the Pacific Light & Power Company, one of the predecessors of the Southern California Gas Company.

George A. Detrick, who has been advanced to head the Auditing Department, has been connected with various Public Utilities in Southern California, and has a wide knowledge of Public Utility Accounting.

C. E. Dotson has been promoted to supervisor of territory assistants at the Wichita, Kansas, Gas Company New Business department.

Monty Pfyl, former sales manager for the Great Western Power Company in the Sacramento Division, was recently transferred to the San Joaquin Light and Power Corporation to take charge of the Gas Sales Division in Fresno, California District. Mr. Pfyl brings with him fourteen years' experience in the power industry in California.

James A. Stewart, formerly assistant Treasurer of the Boston Consolidated Gas Company, was elected Treasurer to fill the vacancy caused by the recent death of Mr. George M. Cox.

R. A. Hastings has been appointed Acting Sales Promotion Manager of the Public Service Company of Northern Illinois, Chicago, succeeding Frederic C. Makey, who resigned to become General Sales Manager of the Federal Electric Co. Household Appliance Division.

Mr. Hastings was formerly assistant in the office of the Vice-President in charge of sales.

F. W. Staffeld was recently appointed Manager of the Securities Department of the Ohio Public Service, Cleveland. Mr. Staffeld has had wide experience in banking operations.

George Ismert recently assumed the duties of local manager of the Kansas Pipe & Gas Company at Larned, Kansas. Mr. Ismert was formerly connected with the Oklahoma Natural Gas Company at Erie, Kansas.

Fred Rinehart has been put in charge of the Puget Sound Power & Light Company's newly acquired property at Langley, Whidby Island, Washington.

Ralph E. Titus was recently appointed Chief Engineer of the Kings County Lighting Company, Brooklyn, N. Y. Mr. Titus started with the company as a cadet engineer nine years ago.

Bernard T. Poor, formerly assistant industrial engineer of the Haverhill Gas Light Company, was recently transferred to the Fall River, Mass., Gas Works Company as Industrial Service Engineer. Mr. Poor is a graduate of the University of Maine.

Obituary

SAMUEL GLOVER

On October 12, 1930, Mr. Samuel Glover, distinguished British Gas Engineer, died at the age of 73. Mr. Glover was a past president of the Manchester District Institution of Gas Engineers and was president of the Institution of Gas Engineers in 1918-19. He was a member of the Institution of Civil Engineers and a Fellow of the Royal Microscopical Society. He was also for some time examiner in gas engineering in connection with the examinations of the City and Guilds of London Institute. He was an expert in the subject of enrichment of coal gas by oil gas, and was closely associated in that connection with the late William Young. On the death of William Young, when the time was ripe for putting into practice various schemes for more efficient gas manufacture, Mr. Glover got into touch with the firm of Wests, which resulted in the Glover-West vertical system of continuous carbonisation.

During the war Mr. Glover superintended work in connection with benzol and toluol production over a large area and gave valuable assistance in the coal control department.

JOSEPH W. PIATT

Joseph Wesley Piatt, an industrial engineer with the Brooklyn Union Gas Company, died on October 7th, in his 54th year, after a protracted illness.

Mr. Piatt had also edited the company's publication, The Weekly Bulletin, and was noted for his writings on the industry.

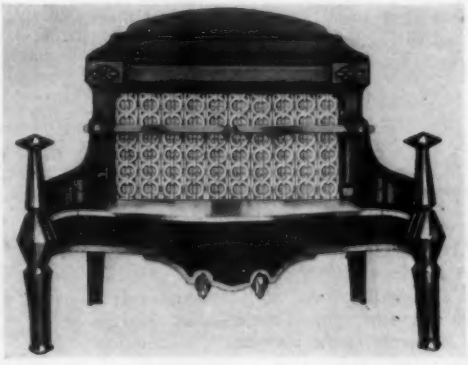
After a career as a teacher and school principal in the mid-West, Mr. Piatt became a traveling salesman, which profession he followed until joining the industrial division of The Brooklyn Union Gas Company as a specialty salesman in May, 1913.

For more than seventeen years he devoted himself to the interests of The Brooklyn Union Gas Company.

During the year 1922 he was in active charge of the division while its head, R. H. Staniford, was ill. On Mr. Staniford's return, Mr. Piatt assumed general duties as an industrial engineer, gradually changing from the selling to the writing field.

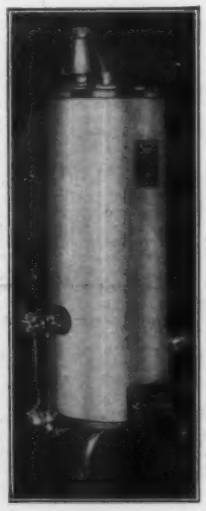
More than five years ago he undertook the task of building up a publication on the activities of the new business department. Under his guidance this periodical became a company publication, conveying each week to employees the activities of the new business department.

Time proved value is of Key Importance in these days of Careful Buying



THESE are days of careful buying. Close scrutiny of value is the rule . . . And the name Welsbach, backed by 40 years of earned leadership in the gas appliance field, is recognized by Commercial Managers more fully than ever before as a definite factor in making sales...**Welsbach Radiant Heaters** are outstanding because of their original design and fine finish—yet are moderately priced . . . Welsbach quality is revealed in every detail of their construction.

Welsbach Water Heaters have gained their leadership through their efficient performance (and favorable prices). In fact there is not a single detail of any Welsbach appliance that will not bear close examination by today's buyers. When Welsbach gas appliances are featured, profitable sales are sure to result.



Member of American Gas Association

WELSBACH COMPANY

GLOUCESTER CITY, N. J.

Offices in Principal Cities

TRADE NEWS

Prominent Inventor Joins the Staff of Pittsburgh Equitable Meter Company

The Pittsburgh Equitable Meter Company announces that Mr. Garrett B. Linderman, Jr., has joined its organization and will be located at the main office in Pittsburgh, Pa. Mr. Linderman, who was for a time connected with the Bethlehem Steel Company and more recently with the Metric Metal Division of the American Meter Company, is a Lehigh University man and is well known throughout the Gas Industry.

The Linderman Orifice Meter is primarily his invention. He has had many years of experience in the industry and has a vast knowledge of its conditions gained through experimental and research work.

Koppers Co. Announce Two New Appointments

Alan H. Harris has been appointed District Engineer for the Koppers Construction Co., with offices at 823 Peoples Gas Building, Chicago, Illinois. Mr. Harris was formerly in the Koppers Construction Co.'s Sales Department in Pittsburgh.

Walter F. Munnikhuysen, formerly District Engineer for the Koppers Construction Co. at Chicago, Illinois, has been appointed Manager of the Connecticut Coke Co. Mr. Munnikhuysen will be located at New Haven, Conn.

Standard Gas Equipment Corporation Announce Several New Popular Priced Insulated Gas Ranges

The Standard Gas Equipment Corporation, 18 East 41st St., New York City, recently issued a New Equipment Bulletin which describes several new popular priced insulated gas ranges. The new ranges are the De Luxe Oriole models, some of the design features of which include flush front, cast iron frame and one piece recessed refrigerator type doors with concealed hinges.

A new refrigerator range is described which fits over a special Electrolux gas refrigerator. The bottom of the range is thoroughly insulated to prevent heat from reaching refrigerator.

Descriptions of a new kitchen heater gas range, built to sell at popular price and the Oriole automatic time and temperature control gas range are also included in this booklet.

Beckwith Company New Range

The Beckwith Company, Dowagiac, Mich., announce the new Round Oak Model "O" gas range. It has 4-way oven heats on all four sides and an automatic cook regulator holds oven temperature at any determined degree of heat. A convenient utensil drawer fits into the cast iron front frame. The finish is in ivory with green trim.

New Naylor Line Pipe Bulletin

An attractive and interesting bulletin has been issued by the Naylor Pipe Company, Chicago, Ill., which contains test data giving comprehensive information about the physical properties of Naylor Pipe of interest to the engineer. The various tests described are illustrated by photographs, charts and tables. Photographs of actual installations are also included, as well as analyses of costs of pipe lines in several diameters.

Pittsburgh Equitable Meter Company Offers New Publication

Pittsburgh Equitable Meter Company, 400 Lexington Avenue, Pittsburgh, Pa., has published a set of multiplier tables, the factors of which are used to correct volumes at higher pressures to volumes at a given base pressure. Multipliers are based on Boyle's law. Instructions for the use of the tables are also given. The pages are punched to fit into the standard Lefax, or similar binder. From time to time, the company plans to publish additional tables and information which will be printed in the same form, and which can be assembled into a binder for reference.

New Purifying Material to be Placed on Market

The Gas Purifying Materials Company of Long Island City, New York, announce a new purifying material soon to be placed on the market, the result of long and intensive research in their laboratory. It is claimed for this material, which is known as G.P.M. Iron Hydroxide, that it possesses greater activity, higher capacity and longer life.

New Bulletin on Stacey Bros. Holders

The Stacey Brothers Gas Construction Company, division of The Stacey Engineering Company, has just issued its Bulletin Number 32 covering Stacey high pressure "Bullets," other holders and products. Copies available at home office, 5535 Vine Street, Cincinnati, or branches at 20 N. Wacker Drive, Chicago, and 420 Lexington Avenue, New York City.

Republic Steel Corp. Opens Office in Tulsa

The Republic Steel Corp. has opened a district sales office in Tulsa, Okla., with C. S. Powers in charge as district sales manager, it is announced by Norris J. Clarke, vice president in charge of sales of the corporation. Mr. Powers formerly was connected with the Republic sales office at Detroit.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, of American Gas Journal, published monthly at East Stroudsburg, Pa., for October, 1930.

State of New York } ss.
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared S. G. Krake, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the American Gas Journal and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, American Gas Journal, Inc., 53 Park Place, New York City; Editor, H. M. Riley, Douglaston, L. I., N. Y.; Managing Editor, none; Business Manager, S. G. Krake, Jamaica, L. I., N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) S. G. Krake, Jamaica, L. I., N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is ——. (This information is required from daily publications only.)

S. G. KRAKE,
Business Manager.

Sworn to and subscribed before me this 23rd day of October, 1930.

(Seal.) ROZELLA BENNETT.
(My commission expires March 30, 1931.)

What This Kompak Guarantee Means To You

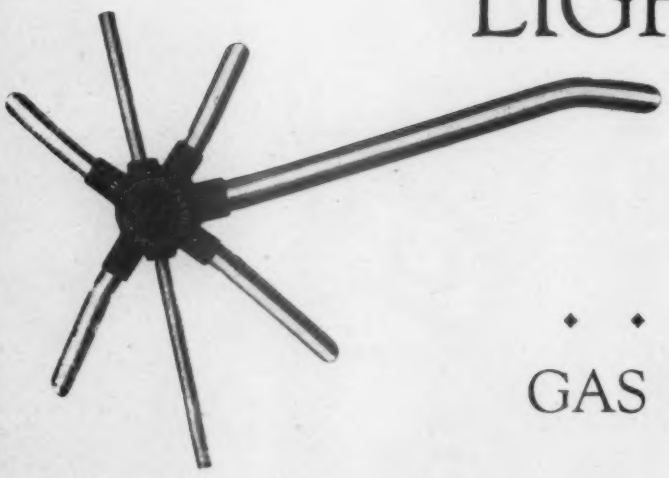
During eight years of manufacture of the Kompak Copper Tank, for the Kompak Automatic Water Heater, every weakness has been eliminated. Mill hard sheets, each separately tested for hardness, are fabricated without heat. There is no guess work,—we *know* that every Kompak will last as long as the house stands. The fuse plug is the guard against overheating.

Cheaper heaters may give a period of satisfactory hot water service. KOMPAK COPPER HEATERS make permanently satisfied users, who need to be sold but once.

Let 1931 see more COPPER users in your City.

THE KOMPAK COMPANY,
NEW BRUNSWICK, N. J.

"PATROL-FLASH" LIGHTER



. . . for GAS RANGES

WITH the "Patrol-Flash" Lighter, correct, safe lighting of all burners is insured. Top burner ignition is instantaneous. Oven burner is lighted as quickly as is possible with a match when correctly applied.

OVEN LIGHTING SAFETY

The "Patrol-Flash" oven lighter feature is that the ignition tube is held firmly in position for most efficient, prompt lighting—unlike the manual method of holding a match somewhere in the vicinity of the Burner, always a source of doubt, if not actual fear, to the woman operator.

SELF RELIGHTING IF EXTINGUISHED

There is no escaping gas danger where the "Patrol-Flash" Lighter is used. Any burner put out by the boiling over of food immediately relights itself. The whisk of wind that extinguishes the low, slow cooking burner no longer need be feared, for the "Patrol-Flash" will continue indefinitely its automatic relighting from the constant-burning pilot.

"Patrol-Flash" Lighter is built for use with the "Patrol" Safety Valve which protects against the escape of gas in event the pilot flame is extinguished. It automatically cuts off the main gas supply.

THE PATROL VALVE COMPANY

Locust and W. 114th Street **Cleveland, Ohio**

It is a GOOD Gas Range That Has This Red Wheel

Patents Pending

TIFFIN model CASH PRICE $99.75 except in extreme Southeast, Rocky Mountains and beyond

Patents Pending

PATRICIAN model CASH PRICE $195.00 except in extreme Southeast, Rocky Mountains and beyond

A New Magic Chef Model at an Attractive Moderate Price

SOMETHING we have always wished for but thought it couldn't be produced!" That's what dealers who have seen the new TIFFIN Model say about this new member of the Magic Chef family.

Priced under $100, this new Magic Chef, in a more compact and convenient size, brings Magic Chef charm and style within reach of thousands of women who could not afford the larger models.

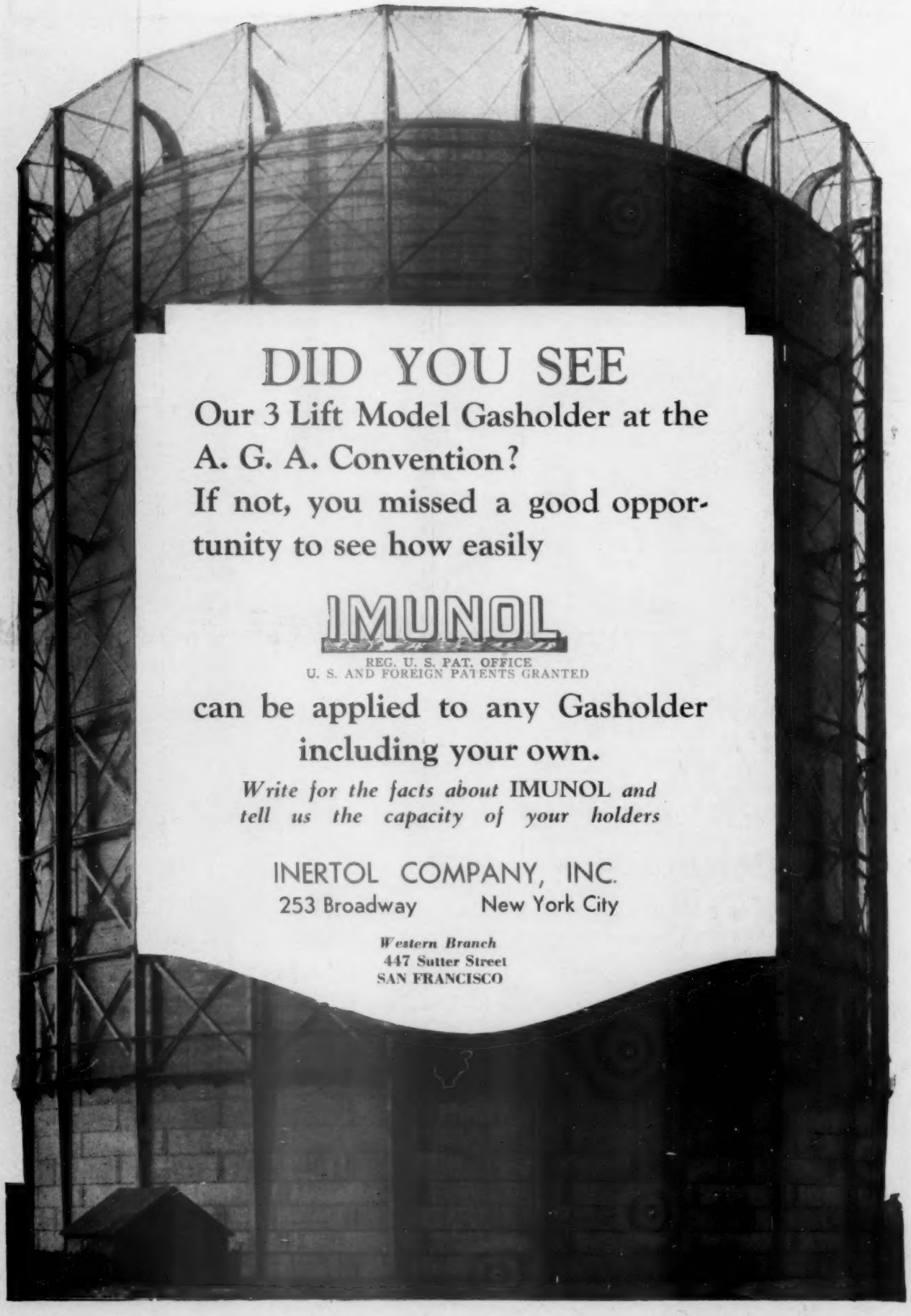
The leading national magazines this fall have carried page and double page advertisements in full color announcing the Tiffin Model of the Magic Chef. These advertisements are attracting wide-spread attention to this remarkable gas range achievement. Dealers everywhere are feeling the response and orders are rolling in at a lively rate. Tie up your store to this important national advertising to get your full share of the substantial demand that is being created for the Tiffin Model of the Magic Chef. There is nothing in the gas range field today that can match it at the price. It will pay you to get full details.

Send name and address for free copy of booklet showing modern kitchens.

Magic Chef

AMERICAN STOVE COMPANY . . . DEPT. B, 801 CHOUTEAU AVENUE, ST. LOUIS, MO

LARGEST MAKERS OF GAS RANGES IN THE WORLD



DID YOU SEE

Our 3 Lift Model Gasholder at the A. G. A. Convention?

If not, you missed a good opportunity to see how easily

IMUNOL

REG. U. S. PAT. OFFICE
U. S. AND FOREIGN PATENTS GRANTED

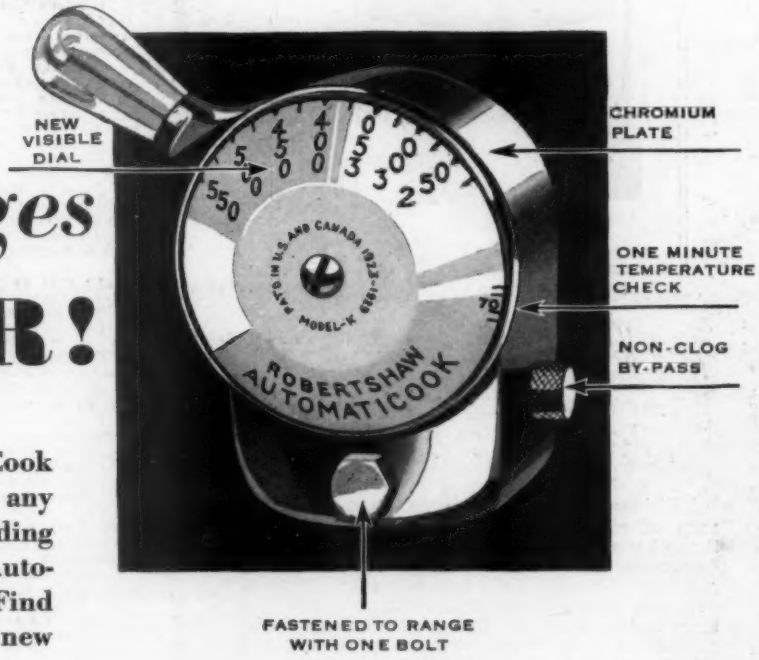
can be applied to any Gasholder including your own.

Write for the facts about **IMUNOL** *and tell us the capacity of your holders*

INERTOL COMPANY, INC.
253 Broadway New York City

Western Branch
447 Sutter Street
SAN FRANCISCO

The NEW "K" *Type* AutomatiCook *is selling Gas Ranges* FASTER!



THE new "K" Type AutomatiCook is a definite selling point on any range. And more than 100 leading makes of gas ranges will be AutomatiCook equipped this year. Find out the selling arguments of the new AutomatiCook—*now!*

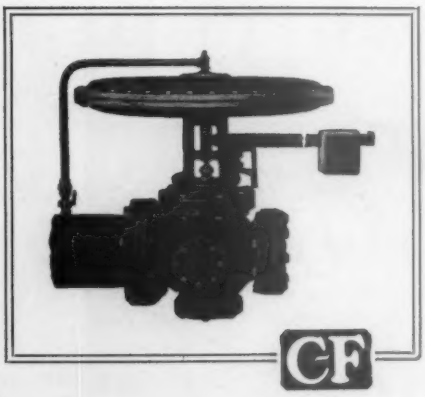
It's smaller, more compact, better looking. Chromium plated. A full vision dial. An absolutely foolproof One-Minute Temperature Check. A non-clog by-pass. Only *one* bolt secures the AutomatiCook to the range. The AutomatiCook is so designed that temperature setting, calibrating and all working parts are accessible from outside the range.

Study up on the new AutomatiCook, now. Write for our descriptive literature. We'll be glad to send this literature to your salesmen and service men, too. Just send us their names. But write *now*—if you want to make selling of gas ranges easier this year!

ROBERTSHAW AutomatiCook

ROBERTSHAW THERMOSTAT COMPANY
Youngwood, Penna.

Efficient Regulation



The Fulton

Low Pressure Regulator

Efficient regulation depends upon the accuracy of the regulation equipment. For more than 40 years the Chaplin-Fulton Manufacturing Company has made regulating devices for the gas industry. That the aim to make the most accurate and reliable equipment possible has been reflected in the Chaplin-Fulton series of regulators is evidenced by their popularity and standing with the foremost gas companies.

For an investment in efficient regulation, the following Chaplin-Fulton Regulators offer you the most that can be built into devices for these purposes.

High Pressure Regulators

Low Pressure Regulators

House Regulators

Illuminating or Dead Weight House Regulators

House Service Regulators—Spring Style

High Pressure Spring Regulators

Little Hercules High Pressure Regulators

Gas-Fuel Boiler Governors

Gas Relief Valves

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Back or Check Pressure Regulators

Write for information and catalogues.

The Chaplin-Fulton Mfg. Co.

ORGANIZED 1884—OLDEST BUILDERS OF GAS REGULATORS IN THE COUNTRY. BUILT IN ALL SIZES, FROM 1 INCH TO 24 INCHES; FOR ALL SERVICES, 1 OZ. UP TO 2,000 LBS. PRESSURE TO SQUARE INCH.

28-40 Penn Avenue Pittsburgh, Pa.

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The Sensation of the A. G. A. Convention

ROPER

Insta-Matic

TRADE MARK

Full Automatic Gas Range

"Almost human!" That's what they said about Roper's Full Automatic Gas Range at the Atlantic City convention. Never before has a product so dramatically captured the spotlight. Read these outstanding features and learn why:

1 SIMPLE OPERATION—a child can set the Clock and the Oven Control—the range does the rest.

2 SIMPLE CONSTRUCTION—completely eliminates priming pilots in oven, messy copper tubing, oven gas cock, etc.

3 ABSOLUTE SAFETY—perfected thermostatic safety valve, working in conjunction with *Roper Insta-Flame*, provides absolute control, and eliminates all danger from escaping gas due to flame being extinguished in pilot or any burner.

4 EASY MANUAL OPERATION—for toasting or other short oven uses, simply turn switch on top rail—oven burner lights instantly and automatically. No pilots in oven—no lighting with matches—no waiting for sufficient heat to be generated to cause thermostatic control to allow gas to enter oven burner. This is all eliminated by the simple Roper construction.

5 NO MORE SPOILED FOODS—AS WITH OLD CONSTRUCTION—old style construction, which used a constantly burning pilot light, raised oven temperature before time control had turned gas on full. This caused foods with large milk content to sour or curdle, before actual baking could start.

6 CONTROL MECHANISM CONCEALED—the only visible evidence of time control on the range is the dial of time clock which protrudes through backrail, along with the "on" and "off" switch.

New Freedom for the Housewife

Now, with a Roper Insta-Matic Gas Range, the housewife has ***absolute control*** over her baking. She can place her food in the oven in the morning, set the simple controls, and leave home for the day. At the time set, the range starts baking. At the second appointed time, the range stops. Upon her return, the housewife will find her dinner baked to a turn, piping hot and ready to serve.

Write or Wire Today For Your Sample Range!

GEO. D. ROPER CORPORATION, *Rockford, Ill.*

Install GAS MAIN Casings

. . . in Less Time
. . . at Lower Cost
. . . without Disturbing the Roadbed
. . . WITHOUT DELAYING TRAFFIC

by the

ARMCO *Jacking Method*

Traffic kept moving while Armco Corrugated Iron Pipe to be used as a main casing, was installed by the Armco Jacking Method under two streets in an Ohio city.

TRAFFIC delays caused by pipe installations on railroads and highways are eliminated by the modern Armco Jacking Method, working entirely under the roadbed. Many public utility, gas and other companies have abandoned the slow, costly open trenching and adopted the plan which saves large sums for them and for the users of traffic arteries.

The Armco Jacking Method of obtaining openings under roads, streets and railways for water or gas mains or other pipe lines means quick completion of the job at a minimum outlay for labor. Savings reported are 30 to 50 per cent under open trenching costs. A small crew is used and no false work is required. It means a job free from inspections and repairs for many years, for Armco Corrugated Iron Pipe has proved its exceptional durability by 24 years continuous service in the ground to date, under every condition of soil, water and pressure. Pure iron lasts!

To keep traffic moving and do better work at less cost, use the Armco Jacking Method, an Armco development. Send for the free booklet of valuable jacking knowledge, "Reducing the Cost of Culvert Placement."

Armco culverts and drains are manufactured from the Armco Ingot Iron of The American Rolling Mill Company and always bear its brand

ARMCO CULVERT MANUFACTURERS ASSOCIATION
Middletown, Ohio

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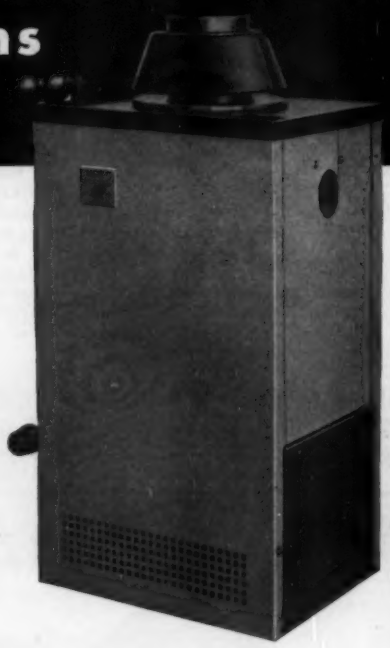
Announcing

the new IDEAL ARCOLA GAS BOILERS

For smaller installations



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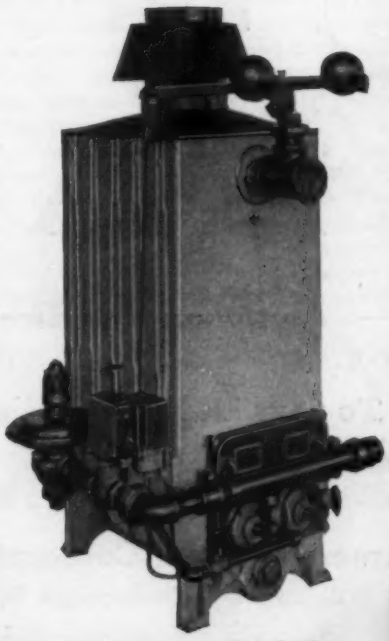

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Now there is an Ideal Gas Boiler for every size installation. The New Ideal Arcola Gas Boilers can be economically installed in even the smallest homes, apartments, lofts and stores, and connected to American Radiators, give the same efficient heating that the larger boilers give to larger buildings.

The small size of the boiler and the low price open up new markets which for the first time can now be supplied—by the new 1-GA and 2-GA Ideal Arcola Gas Boilers alone. And they have another advantage. They are especially suited for furnishing hot water for homes and larger buildings.

Without jacket they are a unique combination of heating boiler, hot water supply boiler and radiator. Write us for details.

manufactured by

AMERICAN RADIATOR COMPANY

division of

AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

distributed by

American Gas Products Corporation
Chrysler Building
New York

These BARBER Regulators are set for 3½ ounce gas pressure—the recommendation of the A.G.A.

Making Gas Meters Popular

That's a tough job but the BARBER Gas Pressure Regulator will help a lot. It's an exceptionally accurate, efficient and dependable device, made with bronze valve body and brass working parts—a really precision instrument. It makes for more satisfactory and safer operation of gas appliances, preventing waste of gas. Your customer uses only what gas he needs; knowing that, he pays the bill more cheerfully.

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THE BARBER GAS BURNER CO.
3702-4 Superior Ave., Cleveland, Ohio

LAVA Pilots

To your individual design
Inquiries solicited

American Lava Corporation
29-59 William St., Chattanooga, Tennessee

Manufacturers of Heat Resistant Insulators

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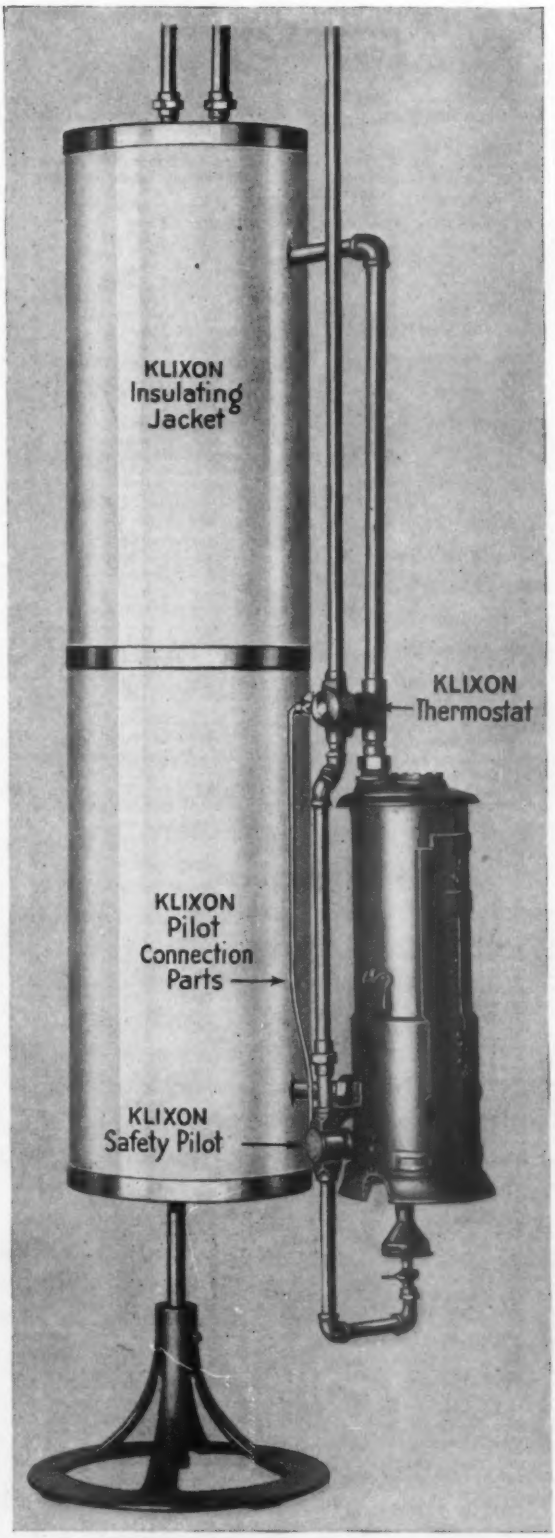

KLIXON

Announces a Complete Kit for Converting TANK HEATERS

CERTAIN progressive gas companies have made wonderful records converting manually operated gas water-heaters into automatic hot-water storage systems by means of the KLIXON Thermostat No. T. G. 13-P. Now KLIXON announces a complete new kit for this profitable business.

COMPLETE. In addition to the famous KLIXON T. G. 13-P Thermostat, this kit contains

KLIXON Kit

everything necessary to do a complete, safe, and handsome job. Each kit contains a thermostat, safety pilot (and accessories), and a 3-ply, air-cell, asbestos boiler insulating jacket. Everything is there, easy to install, to make a handsome job at very low cost. You do not have to drill the boiler, therefore the cost and time for installation is cut in half.

RELIABLE. The KLIXON T. G. 13-P Thermostat has been used to convert thousands of heaters. This thermostat is one of the well known line having exclusive use of the famous Spencer thermostatic disc. It is a tested mechanism approved by leading scientific and engineering organizations. It is used in many famous products.

KLIXON
Thermostat
T. G. 13-P

SAFE. The KLIXON kit contains a KLIXON B-1226 Safety Pilot, which should be a part of every automatic storage system. Again we offer a thoroughly tested product, complete with all fittings.

KLIXON B-1226
Safety Pilot

PROFITABLE. Gas Companies find these conversion jobs doubly profitable as a merchandising and load-building proposition. Every housewife wants automatic hot water and now you can offer it,—a handsome job at a price that is sure to make sales under present business conditions. The owners of thousands of manually operated heaters cannot afford to throw away their present equipment. They do not need to with this KLIXON kit.

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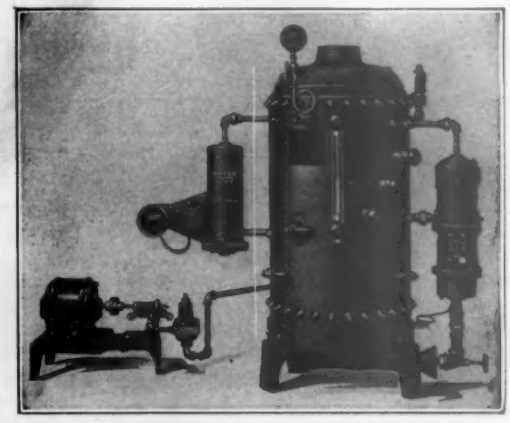
SPENCER THERMOSTAT CO

CAMBRIDGE · · · MASS

Automatic Gas Fired Boilers

Electric Water Feed Systems



All Pressures
½ to 30 Horsepower

P. M. LATTNER MFG. CO.
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GROBLE REGULATORS & GOVERNORS

Complete line of Regulators for

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PROPANE
GASES

HANDY INDICATOR for determining correct orifice size of service regulators according to inlet pressure mailed upon request.

GROBLE GAS REGULATOR COMPANY
***Office and Factory*—Anderson, Indiana**

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The Ideal HOUSE HEATING Salesman

He likes his job. He respects his boss. He enjoys hard work and gets a real thrill whenever a new name goes on the dotted line.

He is well paid. His commissions average high enough to keep him satisfied. He is on top of his worries, clear eyed, happy, keen to tackle the hard ones.

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He knows that every meter should be made profitable . . . but in doing so, realizes that goodwill must be retained. He sells both JANITROL and complete gas-fired equipment. He is honest in his recommendations, . . . for new homes he sells, whenever possible, complete gas-fired boilers or furnaces, . . . for homes already built, with satisfactory heating plants good for years of service, he sells JANITROL. He recommends what the customer can afford and should buy.

He works not by the clock, but where and when an opportunity for a sale exists. He puts in long hours . . . but he keeps fit.

He knows the value of advertising and builds live prospects lists. He watches closely the activity of his publicity department so that direct mail is received before he calls . . . he carries literature with him to leave with his prospects. He follows thru.

He believes gas to be the ideal fuel . . . that its use makes homes happier, healthier, safer, and more comfortable.

He believes in himself and in the future of the Gas Industry. He is not seeking a change for himself for he knows that he betters himself as he better serves.

That kind of salesman builds and strengthens goodwill and makes domestic meters more profitable.

S. C. representatives work closely with Retail House Heating Salesmen . . . They collect many ideas which might be profitably applied to the building of your sales organization. . . . We will welcome the opportunity of discussing this subject with you at your convenience.

THE SURFACE COMBUSTION CO.
INCORPORATED
TOLEDO, OHIO

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for carburetting gas requires high pressure and high temperature.

ANDALE
BOWED TUBE
HEATERS

remain tight and are easily cleaned. These are the requirements for continuous satisfactory operation.

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Economic and Successful coal gas operation follow the use of

LOGAN-CHILTON STANDARD BITUMINOUS GAS COAL

The maximum yield of high B.T.U. Gas and residual marketable coke, are two of the outstanding features.
In generators it assures an open fire.

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Kanawha Valley Building,
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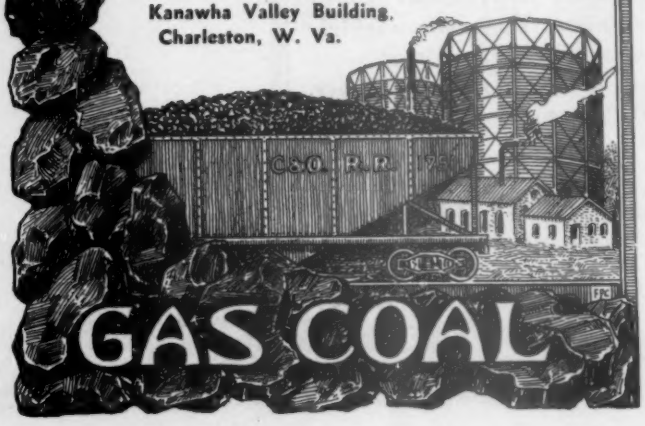

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EDITOR, AMERICAN GAS JOURNAL, 53 PARK PLACE, NEW YORK

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has 14,000 Manufacturing Establishments of which many have World-Wide Reputations.

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are in World-Wide use because they, too, have a "World-Wide Reputation"

THEY ARE GOOD BAROMETERS
THEY ARE REASONABLE IN PRICE

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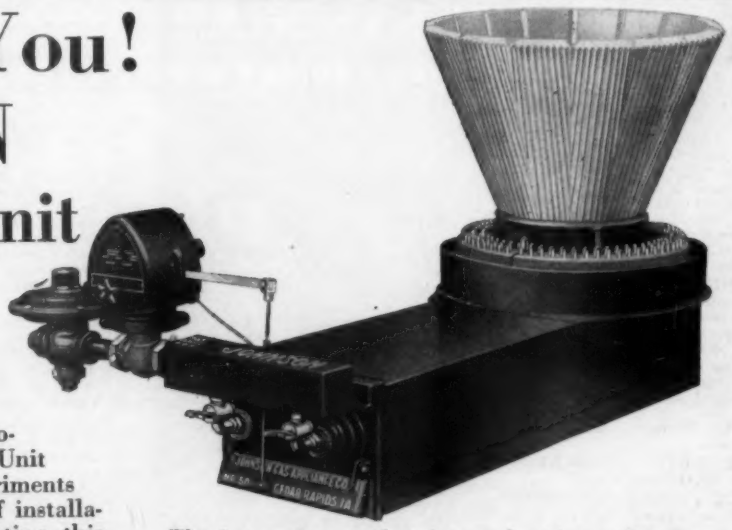
1439 BRANDYWINE STREET - - - - - PHILADELPHIA, PA.

Ready for You!
JOHNSON
Gas Heating Unit



Another highly-perfected Johnson Product

For converting a hot air, hot water, or steam heating plant into an automatic gas-burning plant, the Johnson Unit is a proved success! Exhaustive experiments and tests made under a vast variety of installations, provided the means of perfecting this famous-made unit. The name Johnson is immediately suggestive of notable accomplishments in the manufacture of gas appliances. This Johnson Gas Heating Unit bears the full mark of Johnson skill and experience.

The increasing market for gas-heating units presents genuine load-building possibilities. The Johnson Unit will adequately meet the needs of this active market. It is a dependable, substantial, and economical unit which is more completely described in a folder. Please write.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids JOHNSON PATENTED DIRECT JET **IOWA**

Buyers' Reference Index

See page 119 for advertisements of these products

A. B. C. SELF CLINKERING GRATES
The Western Gas Construction Company.

ACCUMULATORS—STEAM
The Gas Machinery Co.
Kuth's Steam Accumulator Co.
Smoot Engineering Corp.
The Western Gas Construction Company.
United Engineers & Constructors, Inc.

ACETYLENE
The Prest-O-Lite Co., Inc.
Oxweld Acetylene Co.

ACETYLENE EQUIPMENT
American Lava Corp.

AMMONIA CONCENTRATORS
Bartlett Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA CONCENTRATED LIQUOR PLANTS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.

AMMONIA PIPE
National Tube Company.

AMMONIA RECOVERY APPARATUS
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

AMMONIA STILLS
Bartlett-Hayward Co.
Cruse-Kemper Co
The Gas Machinery Co.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA TEST
American Meter Co.

APPRAISALS & INVENTORIES
Stacey Bros. Gas Construction Co.
United Engineers & Constructors, Inc.

APPARATUS
Laboratory Experimental
American Meter Co.
Service
American Meter Co.

ASH REMOVAL EQUIPMENT
Research Corpn.

ASH STORAGE BINS
C. W. Hunt Co., Inc.
Semet-Solvay Engineering Corp.
McClintoc-Marshall Co.
The Stacey Mfg. Co.

AUDITS
United Engineers & Constructors, Inc.

AUTOMATIC CONTROLS FOR WATER GAS APP.
The Brown Instrument Co.
Partlow Corpn.
United Engineers & Constructors, Inc.
The Western Gas Construction Co.

AUTOMATIC RAILWAYS
C. W. Hunt Co., Inc.

BACK PRESSURE VALVES
Connelly Iron Sponge & Governor Co.
Chaplin Fulton Mfg. Co.

BACKRUN GAS EQUIPMENT
Semet-Solvay Engineering Corp.
The Western Gas Construction Co.

BAGS
Safety Gas Main Stopper Co.

BAROMETERS
The Bristol Company
Connelly Iron Sponge & Governor Co.
Precision Thermometer & Instrument Company.

BENCHES
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Gas Machinery Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BENZOL
Bartlett-Hayward Co.
The Koppers Construction Co.

BENZOL RECOVERY PLANTS
Semet-Solvay Engineering Corp.

BLOW TORCHES, ACETYLENE
The Prest-O-Lite Co., Inc.

BLOWERS
Connersville Blower Co., The.
Gas Engineering Co.
The Gas Machinery Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BLUE GAS PLANT
Bartlett-Hayward Co.
Gas Engineering Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BOILER FEED SYSTEMS
Chaplin-Fulton Mfg. Co.
P. M. Lattner Mfg. Co.

BOILERS (GAS FIRED)
P. M Lattner Mfg. Co.

BOILERS—WASTE HEAT
Bartlett-Hayward Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

BOOSTERS
Connelly Iron Sponge & Governor Co.
Connersville Blower Co., The

BRICK
Fire and Checker
The Gas Machinery Co.
General Refractories Co.
Improved Equipment Co.-Russell Eng. Corp.
United Engineers & Constructors, Inc.
United States Refractories Corp.
Silica
The Western Gas Construction Co.
The Gas Machinery Co.
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Company.
United States Refractories Corp.
High Alumina
General Refractories Co.

BRUSHES, PIPE CLEANING
Safety Gas Main Stopper Co.

B. T. U. INDICATORS
Alpha-Lux Co.

BUILDINGS
United Engineers & Constructors, Inc.
The Western Gas Construction Co.

BURNERS (Industrial)
American Lava Corp.
P. M. Lattner Mfg. Co.
Conversion House Heating
Roberts Gordon Appliance Corpn.
Fuel
Philfuels Co.

BUTANE
Philfuels Co.

BY-PRODUCT COKE
Semet-Solvay Co.

BY-PRODUCT PLANTS
Bartlett-Hayward Co.
The Gas Machinery Co.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
West Gas Improvement Co.
The Western Gas Construction Co.

CABLE RAILWAYS
C. W. Hunt Co., Inc.
Alpha-Lux Company.
American Meter Co.
Superior Meter Co.

CALORIMETERS
American Meter Co.

CALCIUM CARBIDE
Union Carbide Sales Co.

CALCIUM CARBIDE
Union Carbide Sales Co.

CARBIDE
Union Carbide Sales Co.

CARBONIZATION
The Gas Machinery Co.

CARBURETTED WATER GAS PLANTS
Bartlett-Hayward Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Co.

CARS
C. W. Hunt Co., Inc.
The Western Gas Construction Co.

CASING, STEEL
Republic Steel Corp.

CASINGS, SEAMLESS STEEL
National Tube Co.

CAST IRON PIPE
Bell & Spigot
Cast Iron Pipe Research Ass'n
United States Pipe & Foundry Co.
The Western Gas Construction Co.

CEMENTS
Acid-proof
General Refractories Co.
Quigley Co., Inc.
Firebrick
Refractory & Engineering Corpn.
Corpn.
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
United States Refractories Corp.
High Temperature
Alpha-Lux Company.
General Refractories Co.
E. J. Lavino & Co.
Quigley Co., Inc.
Refractory & Engineering Corp.
United States Refractories Corp.
Refractory
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Co.
Refractory & Engineering Corpn.
United States Refractories Corp.
Silica
General Refractories Co.
Quigley Co., Inc.

CHAMBER OVENS
United Engineers & Constructors, Inc.

CHARGING MACHINERY
Bartlett-Hayward Co.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

CHUTES
C. W. Hunt Co., Inc.
McClintoc Marshall Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.

CLAMPS (PIPE)
S. R. Dresser Mfg. Co.

CLOCKS & WATCHES, Stop
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COALS
Amherst-Logan County Coal Corpn.
Boone County Coal Corpn.

COAL GAS APPARATUS
Bartlett-Hayward Co.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Company
The Western Gas Construction Company.

COAL & COKE BINS CASTINGS
The Koppers Construction Co.
The Stacey Mfg. Co.
The Western Gas Construction Co.

COAL AND COKE HANDLING MACHINERY
Bartlett-Hayward Co.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
United Engineers & Constructors Inc.

COAL TAR PRODUCTS
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COAL TUBES
C. W. Hunt Co., Inc.
Meter
Superior Meter Co.

COKE CRUSHERS
The Koppers Construction Co.

COKE QUENCHING
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COKE RECLAMATION SYSTEMS
C. W. Hunt Co., Inc.

COMPUTERS
Heating Value
United Engineers & Constructors, Inc.

CONDENSERS
Andale Co.
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.
High Duty
Stacey Bros. Gas Const. Co.
United Engineers & Constructors, Inc.
Wolverine Tube Co.

CONTRACTORS' TUBS
C. W. Hunt Co., Inc.

CONTROLS
The Bristol Company.
The Brown Instrument Co.
Partlow Corpn.
Robertshaw Thermostat Co.
Combustion
Smoot Engineering Corp.
Gas Pressure
Smoot Engineering Corp.
Gas Producer
Smoot Engineering Corp.
Water Gas Machine
Smoot Engineering Corp.

CONVEYORS
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.

CONVERSION UNITS
Roberts Gordon Appliance Corpn.
Surface Combustion Co.

COOLERS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.
Air
Andale Company.
Ammonia Liquor
Andale Company.
Gas
Andale Company.
Oil
Andale Company.
Water to Water
Andale Company

COOLING COILS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

COUPLINGS
Bartlett-Hayward Co.
S. R. Dresser Mfg. Co.
National Tube Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Victaulic Co. of Amer.

COUPLINGS—FLEXIBLE
The P. H. & F. M. Roots Company.

CUBIC FOOT BOTTLES
American Meter Co.
Lambert Meter Co.

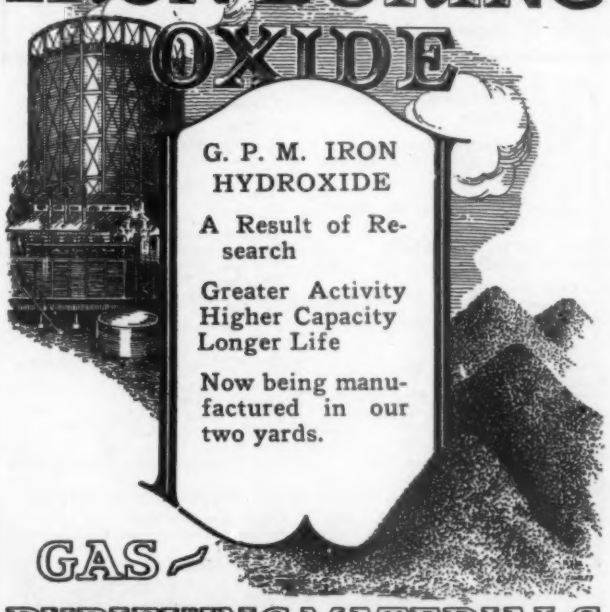
CUTTING APPARATUS & SUPPLIES
Union Carbide & Carbon Co.

CRUSHERS
McClintoc Marshall Co.

DE-EMULSIFIERS
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

DEHYDRATORS, GAS
Andale Company.

IRON BORING OXIDE



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Inflating Bulbs
Pumps
Respirators
Krupa-Hendry Test Cap
Pressure Gauges,—portable and stationary
Gas Sampling Bags
Service Cleaners
Service Testers
Joint Runners
Calking Tools
Mittens and Gloves
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Service Plugs, Rubber
Gas Main Plugs
Soft Wood Plugs
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Packings

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Kansas City, Mo.
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Street .....
City ..... State .....

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Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

DEMONSTRATION METERS
American Meter Co.
Lambert Meter Co.

DIAPHRAGMS (Meter)
American Meter Co.
Lambert Meter Co.
Superior Meter Co.

DISCHARGING MACHINERY
Bartlett-Hayward Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.

DRAFT GAUGES
The Bristol Company
Brown Instrument Co., The
Precision Thermometer & Instrument Company.

DUPLEX HEATING SYSTEMS
Roberts-Gordon Appliance Corpn.
Surface Combustion Co.

ELECTRIC LOCOMOTIVES
C. W. Hunt Co., Inc.

ELEVATORS
C. W. Hunt Co., Inc.

ENGINEERS
American Meter Co.
The Gas Machinery Co.
Southwestern Pipe Joint & Eng. Co.
Combustion
Bartlett-Hayward Co.
The C. M. Kemp Mfg. Co.
Smoot Engineering Corp.
United Engineers & Constructors, Inc.
Consulting
Bartlett-Hayward Co.
Edw. A. Dieterle
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
Contracting
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Company.
C. W. Hunt Co., Inc.
Improved Equipment
Russell Engineering Corpn.
Isbell-Porter Company
McClintoc Marshall Co.
Stacey Gros. Gas Const. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.
Distribution
United Engineers & Constructors, Inc.
Measurement
American Meter Co.
Connersville Blower Co.

EXHAUSTERS
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The Gas Machinery Co.
Isbell-Porter Company.
The P. H. & F. M. Roots Company.
The Western Gas Construction Company

EXPANSION BENDS
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Semet-Solvay Engineering Corp.

FILTERS, Gas
American Meter Co.

FIREBRICK CEMENT
General Refractories Co.
Quigley Co., Inc.
Refractory & Engineering Corp.

FIREBRICK CHECKER BRICK
The Gas Machinery Co.
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

FIRST AID EQUIPMENT
United Engineers & Constructors, Inc.

FITTINGS
S R Dresser Mfg. Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
U. S. Cast Iron Pipe and Foundry Co.
The Western Gas Construction Company.
Plain End and Flanged
Cast Iron Pipe Research Association.

FIXTURES
American Lava Corp.

FLOORS, IRON, BRICK, AND STEEL
The Gas Machinery Co.
McClintoc Marshall Co.
Semet-Solvay Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

FLOW METERS
American Meter Co.
Brown Instrument Co., The
Lambert Meter Co.

FLUE PIPE (Cast Iron Oval)
Semet-Solvay Engineering Corp.

FURNACES
Gas Fired
Geo. D. Roper Corp.
Gas Soldering
American Meter Co.
Johnson Gas Appliance Co.

GAS ANALYSIS APPARATUS
American Meter Co.
Metric Metal Works.

GASKETS
American Meter Co.
Pittsburgh Equitable Meter Co.
Reynold Gas Regulator Co.
Superior Meter Co.

GAS COAL
Amherst-Logan County Coal Corpn.
Boone County Coal Corpn.

GAS MAIN CONDUITS
Armco Culvert Manufacturers Assn.

GASOMETERS (Test)
American Meter Co.

GAS PLANTS, COMPLETE
Gas Engineering Co.
Improved Equipment-Russell Engineering Corpn.
Isbell-Porter Company.
Philfuels Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Co.

GAS SCREEN
Connelly Iron Sponge & Governor Co.

GASSING MACHINE
American Meter Co.
Lambert Meter Co.
Superior Meter Co.

GAS TAPE
Connelly Iron Sponge & Governor Co.

GAS TESTING APPARATUS
American Meter Co.
Metric Metal Works.

GATE VALVES (See Valves)

GATES—WIND & BLAST
The P. H. & F. M. Roots Company
The Western Gas Construction Co.

GAUGE BOARDS
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Brown Instrument Co., The
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Lambert Meter Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

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The Bristol Company.
Brown Instrument Co., The
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Lambert Meter Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Superior Meter Co.
The Western Gas Construction Company.
Mercury
Precision Thermometer & Instrument Company.
Pressure-Recording
American Meter Co.
Brown Instrument Co.
Precision Thermometer & Instrument Company.
Siphon
Precision Thermometer & Instrument Company.
Tank
Brown Instrument Co.
Precision Thermometer & Instrument Company.
Water
Precision Thermometer & Instrument Company.

ACETYLENE, WELDING
Oxweld Acetylene Co.

GLOVES
Rubber
Safety Gas Main Stopper Co.

GOVERNORS
Pittsburgh Equitable Meter Co.
Automatic
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.

GOVERNORS (Calorimeter and Double Dry)
American Meter Co.
Reynolds Gas Regulator Co.
Coke Oven
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
District
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Isbell-Porter Co.
Smoot Engineering Corp.
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Connelly Iron Sponge & Governor Co.
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Isbell-Porter Co.
The P. H. & F. M. Roots Company.
Smoot Engineering Corp.
High Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
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Connelly Iron Sponge & Governor Co.
Lambert Meter Co.
D. McDonald & Co.
Reynolds Gas Regulator Co.
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The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Lambert Meter Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Retort House
Isbell-Porter Company.
Station

GRATES for Water Gas Generators
Semet-Solvay Engineering Corp.
The Western Gas Construction Co.

GRAVITOMETERS
Precision Thermometer & Instrument Company.

GRIDS, for Scrubbers
Semet-Solvay Engineering Corp.
The Western Gas Construction Co.

GUN-REFRACTORY
Quigley Co., Inc.

HEATERS
Feed Water
Andale Company.
For Oil
Andale Co.
American Gas Products Corp.
American Stove Company.
Homestead Heater Company
Kompak Company
Roberts-Gordon Appliance Corpn.
Welsbach Company.

HIGH CAPACITY METERS
Lambert Meter Co.

HOISTS
The Gas Machinery Co.
C. W. Hunt Co., Inc.
The Western Gas Construction Co.

HOLDERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
McClintoc Marshall Co.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
The Western Gas Construction Co.

HOPPERS—COAL AND COKE
Bartlett-Hayward Co.
Cruse-Kemper Co.
C. W. Hunt Co., Inc.
McClintoc Marshall Co.
The Stacey Mfg. Co.
The Western Gas Construction Co.

HIGH PRESSURE STORAGE
Cruse Kemper Co.
Stacey Bros. Gas Construction Co.
Stacey Mfg. Co.

HOWARD AUTOMATIC CHARGERS
The Western Gas Construction Company.

HYDROGEN GAS APPARATUS
Bartlett-Hayward Co.
Cruse Kemper Co.
Gas Engineering Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Co.

HYDROGEN SULPHITE TEST (Apparatus)
American Meter Co.

HYDROMETERS
The Brown Instrument Co.
Precision Thermometer & Instrument Company.

INCINERATORS, GAS-FIRED
Kernit Incinerator Co.

INDUSTRIAL EQUIPMENT
Johnson Gas Appliance Co.
Surface Construction Co.

INDUSTRIAL GAS MIXERS
Roberts-Gordon Appliance Co.
Smoot Engineering Corp.

INDUSTRIAL TRACK
C. W. Hunt Co., Inc.

IRON BORING OXIDE
Alpha Lux Co.
Gas Purifying Materials Co., Inc.

IRON SPONGE
Alpha Lux Co.
Connelly Iron Sponge & Governor Co.

INSTRUMENTS
Alpha-Lux Company
American Meter Co.
The Bristol Company.
Brown Instrument Co., The
Lambert Meter Co.
Metric Metal Works.
Precision Thermometer & Instrument Company.

INSULATION
Insulating Cements
Refractory & Engineering Corpn.

JOINTS (Pipe)
S. R. Dresser Mfg. Co.
Southwestern Pipe Joint & Eng. Co.
United States Pipe & Foundry Co.
Insulating
United Engineers & Constructors, Inc.
Victaulic Co. of Amer.

JOINT RUNNERS
Safety Gas Main Stopper Co.

LAUNDRY STOVES
Geo. D. Roper Corp.

Byllesby Engineering and Management Corporation

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ENGINEERING FINANCE MANAGEMENT

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Pittsburgh San Francisco

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Wet Meters
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Apparatus

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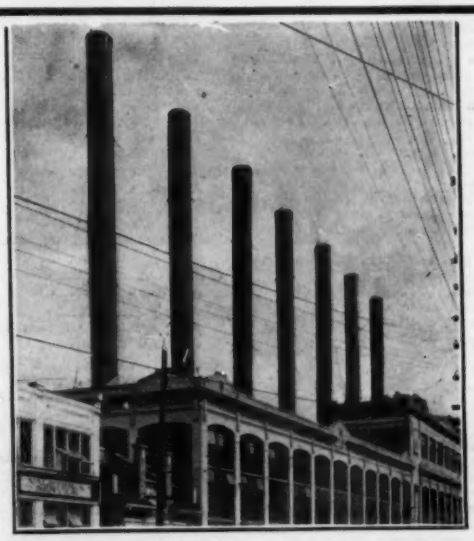

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See page 119 for advertisements of these products

LAVA BURNER GRIDS
American Lava Corp.
LAVA PILOT TIPS
American Lava Corp.
LINING—REFRACTORY
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LINE PIPE
Electric Weld-Steel.
LIQUEFIED PETROLEUM GASES
Philfuels Co.
LUGS—SOLDERING
Wolverine Tube Company.
LUX MATERIAL
Alpha-Lux Company.
LUX SPONGE
Alpha-Lux Company.
MANILA AND WIRE ROPE
C. W. Hunt Co., Inc.
MANOMETERS
American Meter Co.
Brown Instrument Co., The
Precision Thermometer & Instrument Company.
MASKS—GAS
Safety Gas Main Stopper Co
MAST & GAFF OUTFITS
C. W. Hunt Co., Inc.
MEASURING CHUTES
C. W. Hunt Co., Inc.
MECHANICAL GENERATORS
for Water Gas App.
United Engineers & Constructors, Inc.
The Western Gas Construction Co.
METER CONNECTIONS
American Meter Co.
Bartlett-Hayward Co.
S. R. Dresser Mfg. Co.
Lambert Meter Co.
Pittsburgh Equitable Meter Co.
Superior Meter Co.
METER REPAIRING
American Meter Co.
Lambert Meter Co.
Superior Meter Co.
METER TESTER, Hydro-Pneumatic
American Meter Co.
METERS
American Meter Co.
Brown Instrument Co., The
Pittsburgh Equitable Meter Co.
Air
Brown Instrument Co.
Connersville Blower Co., The
The Gas Machinery Co.
Lambert Meter Co.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
Artificial
American Meter Co.
Connersville Blower Co., The
Lambert Meter Co.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Demand
American Meter Co.
Brown Instrument Co.
Connersville Blower Co., The
Lambert Meter Co.
The P. H. & F. M. Roots Company.
Superior Meter Co.
Demonstration
District
American Meter Co.
Connersville Blower Co.
Dry
American Meter Co.
Connersville Blower Co.
Lambert Meter Co.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Exhibition
American Meter Co.
High Pressure
Natural Gas
American Meter Co.
Brown Instrument Co.
Connersville Blower Co., The
Lambert Meter Co.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Oil
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Orifice
American Meter Co.
Positive
The Sprague Meter Co.
Prepayment
American Meter Co.
The Sprague Meter Co.
Superior Meter Co.
Proportional
The P. H. & F. M. Roots Company.
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Station
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American Meter Co.
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Steam
American Meter Co.
The Gas Machinery Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company
Test
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The Sprague Meter Co.
Superior Meter Co.
Wet Test
American Meter Co.
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American Meter Co.
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MILLER GRIP PACKING
Connelly Iron Sponge & Governor Co.
MIXERS, GAS
Robert-Gordon Appliance Corpn.
Semet-Solvay Engineering Corp.
Smoot Engineering Corp.
MOISTURE DETERMINATORS
United Engineers & Constructors Inc.
MOTORS, AIR OR GAS
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MOTOR CARS
C. W. Hunt Co., Inc.
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The Western Gas Construction Company.
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Quigley Co., Inc.
ORIFICE METERS
American Meter Co.
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The Bruce McDonald Co.
Geo. D. Roper Corp.
OVENS, COKE AND GAS
Improved Equipment
Russel Engineering Corpn.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Costruction Co.
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Connelly Iron Sponge & Governor Co.
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E. J. Lavino & Co.
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Oxweld Acetylene Co.
OXYGEN
Linde Air Products Co.
OXYGEN AND HYDROGEN METERS
American Meter Co.
Lambert Meter Co.
Superior Meter Co.
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Asbestos
Safety Gas Main Stopper Co.
PACKING FIBRE
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Inertol Co., Inc.
Quigley Co., Inc.
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Metal Protective
Semet-Solvay Co.
PAINTS, ANTI ACID AND ALKALI
Cheesman-Elliott Co.
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Quigley Co., Inc.
PAINTS, RUSTPROOF
Cheesman-Elliott Co.
Inertol Co., Inc.
Quigley Co., Inc.
PENTANE
Philfuels Co.
PHOTOMETERS
Connelly Iron Sponge & Governor Co.
PILOTS-SAFETY
Spencer Thermostat Co.
PILOT TIPS
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PIPE
Waylow Pipe Co.
National Tube Co.
The Stacey Mfg. Co.
United States Pipe & Foundry Co.
The Western Gas Construction Co.
Bell
American Meter Co.
Semet-Solvay Engineering Corp.
McWane Cast Iron Pipe Co.
Bell and Spigot
U. S. Cast Iron Pipe & Foundry Co.
Cast Iron
American Cast Iron Pipe Co.
Southwestern Pipe Joint & Eng Co.
McWane Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Foundry Co.
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Semet-Solvay Engineering Corp.
U. S. Cast Iron Pipe & Foundry Co.
Screw Joint Cast Iron Pipe
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McWane Cast Iron Pipe Co.
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Wailes Dove-Hermiston Corp.
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Improved Equipment-Russell Engineering Corp.
The Koppers Construction Co.
Philfuels Co.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company
PLATES
Cruse-Kemper Co.
C. W. Hunt Co., Inc.
The Stacey Mfg. Co.
The Western Gas Construction Company.
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The Gas Machinery Co.
McClintoc Marshall Co.
The Stacey Bros. Gas Construction Co.
United Engineers & Constructors, Inc.
PLUGS, SERVICE AND MAIN
Rubber
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Soft Wood
Safety Gas Main Stopper Co.
PORTABLE TEST METERS
American Meter Co.
Lambert Meter Co.
Superior Meter Co.
PRODUCER GAS PLANT
Gas Engineering Co.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
PRODUCER GAS STEAM
American Meter Co.
PROPANE
Philfuels Co.
PROVERS—Critical Flow for H. P. Field Testing
American Meter Co.
PROVERS—METER
American Meter Co.
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Pittsburgh Equitable Meter Co.
Superior Meter Co.
PUMPS
Boiler Feed
P. M. Lattner Mfg. Co.
Drip
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Lambert Meter Co.
D. McDonald & Co.
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Gas
Connersville Blower Co..
The P. H. & F. M. Roots Company.
Geo. D. Roper Corp.
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Safety Gas Main Stopper Co.
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American Meter Co.
Lambert Meter Co.
Safety Gas Main Stopper Co.
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Connersville Blower Co., The
The Gas Machinery Co.
The P. H. & F. M. Roots Company.
Power
Connersville Blower Co., The
The P. H. & F. M. Roots Company.
Geo. D. Roper Corp.
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Connersville Blower Co., The
The P. H. & F. M. Roots Company.
Service
American Meter Co.
Lambert Meter Co.
Superior Meter Co.
Service Cleaner
American Meter Co.
Lambert Meter Co.
Safety Gas Main Stopper Co.
Superior Meter Co.
Tar
Connersville Blower Co., The
The P. H. & F. M. Roots Company.
Geo. D. Roper Corpn.
Water
Connersville Blower Co., The
The P. H. & F. M. Roots Company.
Vacuum
American Meter Co.
Connersville Blower Co., The
Geo. D. Roper Corpn.
The P. H. & F. M. Roots Company.
PURIFIERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas. Const. Co.
The Stacey Mfg. Co.
Riter-Conley Company.
United Engineers & Constructors, Inc.
The Western Gas Construction Company
PURIFYING MATERIALS
Alpha-Lux Company.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Gas Purifying Materials Co., Inc.
The Koppers Construction Co.
E. J. Lavino & Co.
PURIFIER TRAYS
Bartlett-Hayward Co.
Connelly Iron Sponge & Governor Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas Const. Co.
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The Western Gas Construction Company.

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The Brown Instrument Co.
The Bristol Company.
The Western Gas Construction Company.
Indicating
The Brown Instrument Co.
The Gas Machinery Co.
United Engineers & Constructors, Inc.
Recording
The Brown Instrument Co.
The Gas Machinery Co.
United Engineers & Constructors, Inc.

RADIATORS
Gas Steam
American Gas Products Corp.

RADIATORS—VERTICAL FIN
Wolverine Tube Co.

RANGES—GAS
American Stove Co.
Geo. D. Roper Corpn.
Standard Gas Equipment Corp.

RANGES (HOTEL AND RESTAURANT)
Geo. D. Roper Corpn.
Standard Gas Equipment Corp.

RECORDERS—LIQUID LEVEL
The Bristol Co.
The Brown Instrument Co.

RECORDING DEMAND METERS
American Meter Co.
The Brown Instrument Co.
Lambert Meter Co.

REFRACTORY CEMENTS
The Gas Machinery Co.
General Refractories Co.
Improved Equipment—Russell Engineering Corp.
E. J. Lavino & Co.
Quigley Co., Inc.
Refractory & Engineering Corp.

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Quigley Co., Inc.

REFRACTORY LININGS
Alpha-Lux Company
The Gas Machinery Co.
General Refractories Co.
Improved Equipment—Russell Engineering Corp.
Quigley Co., Inc.
Refractory & Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company

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Electrolux Sales Corpn.
Faraday Corp.

REGULATORS
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The Chaplin Fulton Mfg. Co.
Connersville Co., The
Connelly Iron Sponge & Governor Co.
Grobie Gas Regulator Co.
Isbell-Porter Co.
Partlow Corpn.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Robertshaw Thermostat Co.
Smoot Engineering Corp.
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Air Pressure
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Chaplin-Fulton Mfg. Co.
Smoot Engineering Corp.
Coke Oven Suction Main
Smoot Engineering Corp.
Exhauster
Brown Instrument Co.
Connersville Blower Co.
Smoot Engineering Corp.
Furnace Pressure
Smoot Engineering Corp.
Oven
American Stove Co.
Pressure
Chaplin-Fulton Mfg. Co.
Connersville Blower Co.
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Chaplin-Fulton Mfg. Co.
Smoot Engineering Corp.
The Brown Instrument Co.
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Chaplin-Fulton Mfg. Co.
Connersville Blower Co.

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American Meter Co.
Lambert Meter Co.

RESPIRATORS
Connelly Iron Sponge & Governor Co.
Safety Gas Main Stopper Co.

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Horizontal and Inclined
Improved Equipment—Russell Engineering Corp.
Vertical
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West Gas Improvement Co.
Silica and Clay
Improved Equipment—Russell Engineering Corp.
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RETORT CEMENT
Alpha-Lux Company
General Refractories Co.
The Gas Machinery Co.
Improved Equipment—Russell Engineer Corp.
Quigley Co., Inc.

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Reynolds Gas Regulator Co.

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Chaplain Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
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Spencer Thermostat Co.

SCREENS, ELECTRIC VIBRATING
C. W. Hunt Co. Inc.

SCRUBBERS
Bartlett Hayward Co.
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Gas Engineering Co.
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Isbell-Porter Co.
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The Stacey Mfg. Co.
West Gas Improvement Co.
The Western Gas Construction Company.

SEAL, DEAD WEIGHT
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Spencer Thermostat Co.

SERVICE BOXES
The Stacey Mfg. Co.

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American Meter Co.
Safety Gas Main Stopper Co.
Superior Meter Co.

SERVICE PLUG-RUBBER
Connelly Iron Sponge & Governor Co.
Safety Gas Main Stopper Co.

SKIP HOIST
C. W. Hunt Co. Inc.

SPECIFIC GRAVITY APPARATUS
American Meter Co.

SPECIFIC GRAVITY GAUGES
Alpha-Lux Company.

SPONGE
Alpha-Lux Company
Connelly Iron Sponge & Governor Co.
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The Gas Machinery Co.
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The Western Gas Construction Company

STOPPERS
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STRAINERS—GAS, STEAM, WATER, OIL
Andale Company.

STREET DEPT. EQUIPMENT
American Meter Co.
Connelly Iron Sponge & Governor Co.
Safety Gas Main Stopper Co.

STREET LAMPS
Welsbach Street Lighting Co.

SULPHUR AND AMMONIA TEST (Apparatus)
American Meter Co.

SYSTEMS
Combustion Control
Smoot Engineering Corp.

TACHOMETERS
Brown Instrument Co., The
The Bristol Company.
Precision Thermometer & Instrument Company

TAMPERS AND BACKFILLERS
The Cleveland Trencher Co.

TANK REGULATORS
Chaplin Fulton Mfg. Co.
Reynolds Gas Regulator Co.

TANKS
Bartlett-Hayward Co.
Cruse-Kemper Company.
Gas Engineering Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Stacey Bros. Gas Construction Co.
The Western Gas Construction Company.
Gas, Oil, Storage
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
High Pressure
The Gas Machinery Co.
McClintoc Marshall Co.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.

TANKS, ACETYLENE GAS
The Prest-O-Lite Co., Inc.

TAPE SOAP—BINDING
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The Gas Machinery Co.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.

TAR DISPLACEMENT SYSTEM
The Gas Machinery Co.

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Bartlett-Hayward Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
Research Corpn.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.
The Western Gas Construction Company.
United Engineers & Constructors, Inc.

TEMPERATURE CONTROLING DEVICE—Oven
American Stove Co.
The Bristol Company.
Brown Instrument Co., The
Partlow Corpn.
Robertshaw Thermostat Co.

TESTING APPARATUS, GAS
American Meter Co.
Pittsburgh Equitable Meter Co.
Precision Thermometer & Instrument Company

THERMOCOUPLER
The Brown Instrument Co.

THERMOMETERS
American Meter Co.
The Bristol Company.
Brown Instrument Co., The
Lambert Meter Co.

THERMOCOUPLE TUBES
The Brown Instrument Co.
Precision Thermometer & Instrument Company.
Superior Meter Co.

THERMOSTATS
The Bristol Company
Brown Instrument Co., The
Partlow Corpn.
Precision Thermometer & Instrument Company
Robertshaw Thermostat Co.
Spencer Thermostat Co.

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American Gas Products Corp.

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National Tube Co.

TUBES
Seamless Steel
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TUBING — (Seamless) ALUMINUM, COPPER, BRASS
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Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
Pittsburgh Equitable Meter Co.
Precision Thermometer & Instrument Company.
Safety Gas Main Stopper Co.
Superior Meter Co.

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UNIT HEATERS
Wolverine Tube Co.

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The Bristol Company.
Brown Instrument Co., The
Lambert Meter Co.
Pittsburgh Equitable Meter Co.
Precision Thermometer & Instrument Company.

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Bartlett-Hayward Co.
Chaplin-Fulton Mfg. Co.
Darling Valve and Manufacturing Co.
The Gas Machinery Co.
Grobie Gas Regulator Co.
C. W. Hunt Co., Inc.
The Ludlow Valve Mfg. Co.
Pittsburgh Equitable Meter Co.
Semet-Solvay Engineering Corp.
High Pressure Special
Smoot Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Construction Co.

VALVES—BY-PASS
The P. H. & F. M. Roots Company.

VALVES—DEAD WEIGHT
Chaplin-Fulton Mfg. Co.

VALVES—DIAPHRAGM
The P. H. & F. M. Roots Company.

VALVES—WEIGHT AND LEVER TYPE
Chaplin-Fulton Mfg. Co.

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Darling Valve and Manufacturing Co.
The Gas Machinery Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.

VALVES—HUNTOON
The P. H. & F. M. Roots Company.

VALVES—RELIEF
Chaplin Fulton Mfg. Co.
Reynolds Gas Regulator Co.
The P. H. & F. M. Roots Company.
Spencer Thermostat Co.

VALVES—3 Way
Andale Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Co.

WASTE HEAT BOILERS
(See Boilers)
The Gas Machinery Co.
Improved Equipment—Russell Engineering Corp.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

WATER FEED SYSTEMS (Boiler)
Chaplin-Fulton Mfg. Co
P. M. Lattner Mfg. Co.

WATER GAS APPARATUS
Bartlett-Hayward Co.
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Isbell-Porter Company.
Semet-Solvay Engineering Corp
The Stacey Mfg. Co.
The Western Gas Construction Co.

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Humphrey Co.
Ruud Mfg. Co.
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1876 [USE THE BENEFIT OF 54 YEARS EXPERIENCE] 1930

MAKE A CHRISTMAS GIFT TO ALL HUMANITY

This little reminder booklet, for listing the Christmas cards and gifts you wish to send, will help you in your Christmas shopping. It costs a dollar—and this dollar goes into the fight for the control of cancer. The fight against cancer has been waged by the New York Cancer Committee for four years, and has been the means of saving many valuable lives to the community. Your contribution will be a Christmas gift to all humanity.

NEW YORK CITY CANCER COMMITTEE

OF THE AMERICAN SOCIETY FOR THE CONTROL OF CANCER

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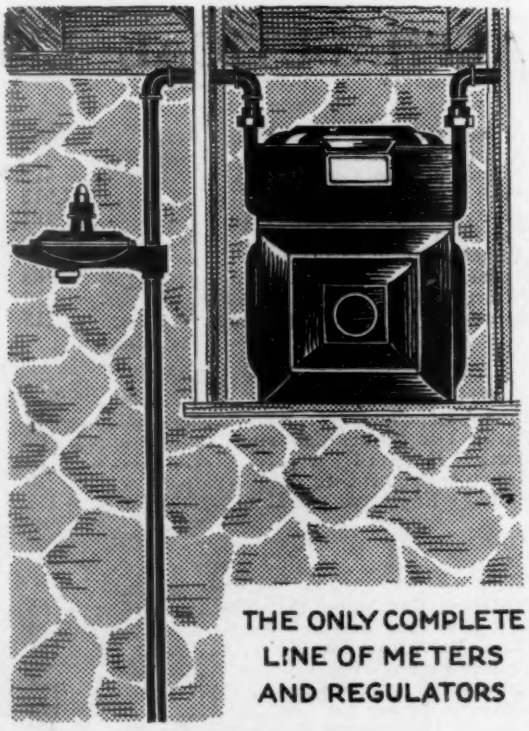
DOMESTIC INSTALLATIONS EMCO TIN METER



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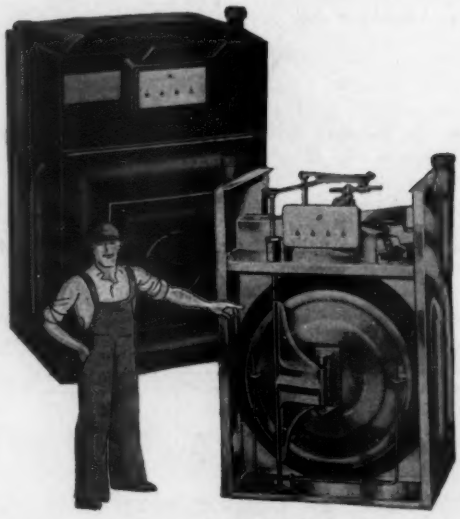
A truly EMCO product in design, construction and accuracy. A tangent permitting easy and accurate adjustments, that has proven successful for many years in our iron meters. The rock shaft is rigid, long wearing and easily serviced. Index, the best obtainable, held rigidly in place by unique arrangement of supports.

Inlet parts are above the gallery table in both type meters. All ports of EMCO A and B type meters are exactly interchangeable with each other, except the valve, valve seat and crank. Each meter must pass three tests to prove its accuracy before being passed by our inspectors.



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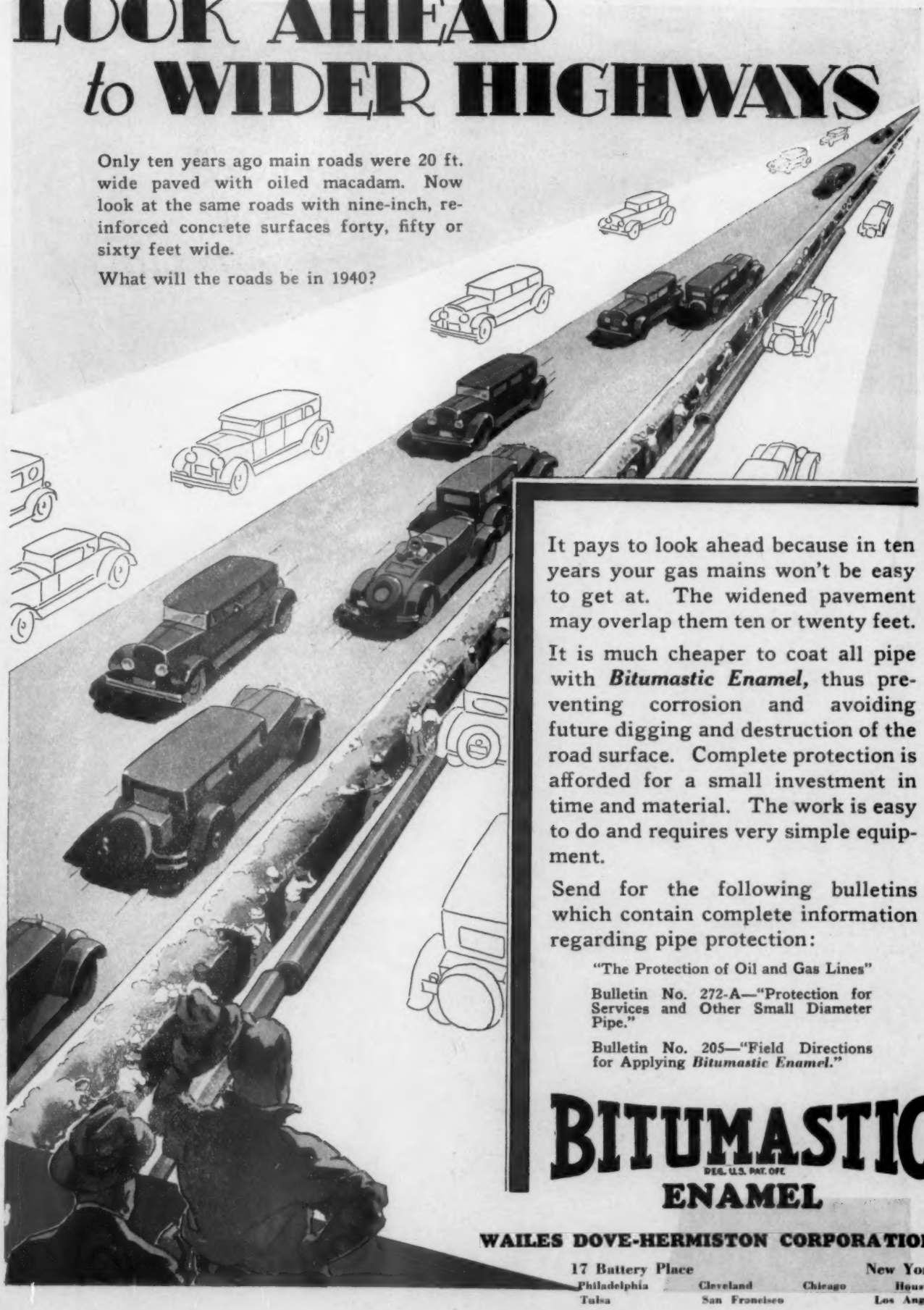
LOOK AHEAD *to* WIDER HIGHWAYS

Only ten years ago main roads were 20 ft. wide paved with oiled macadam. Now look at the same roads with nine-inch, reinforced concrete surfaces forty, fifty or sixty feet wide.

What will the roads be in 1940?



It pays to look ahead because in ten years your gas mains won't be easy to get at. The widened pavement may overlap them ten or twenty feet.

It is much cheaper to coat all pipe with ***Bitumastic Enamel,*** thus preventing corrosion and avoiding future digging and destruction of the road surface. Complete protection is afforded for a small investment in time and material. The work is easy to do and requires very simple equipment.

Send for the following bulletins which contain complete information regarding pipe protection:

"The Protection of Oil and Gas Lines"

Bulletin No. 272-A—"Protection for Services and Other Small Diameter Pipe."

Bulletin No. 205—"Field Directions for Applying *Bitumastic Enamel.*"

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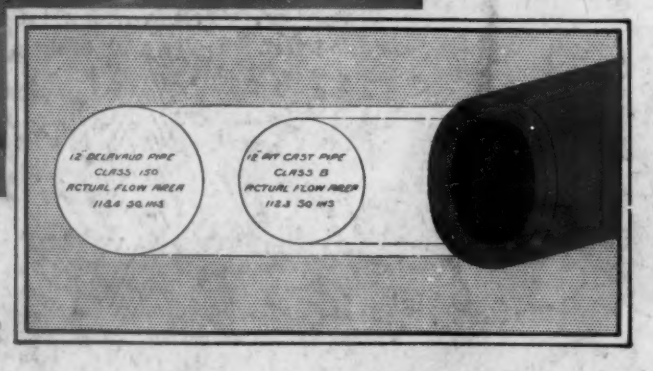
Above: The deLavaud machine in operation.



Below: Graphic illustration showing the greater carrying capacity of de Lavaud pipe.

This stronger flexible deLavaud pipe *has greater carrying capacity*

A cast iron pipe of greater strength, greater carrying capacity and uniform flexibility—such is deLavaud pipe. Its dense, even-grained metal shows an average tensile strength of 30,000 lbs. per square inch. This density results in reduced wall thickness for given pressures and increased carrying capacity of approximately 5% greater than that of pit-cast pipe.

The density and even-grained structure of deLavaud pipe metal result from its unique method of manufacture. This pipe is produced by pouring molten iron into a rapidly revolving cylindrical metal mold. Centrifugal force holds the metal against the sides of the mold with a pressure resulting from a force many times greater than gravity. Immediately after coming from the machine, every length of deLavaud pipe is uniformly annealed in a specially constructed furnace where controlled heat eliminates all casting strains.

DeLavaud pipe is remarkably light in weight—easy and inexpensive to handle. Easy to cut and tap too. Manufactured in thicknesses and weights in strict accordance with the specifications of the American Water Works Association and the American Gas Association as well as the United States Government Specifications. The new deLavaud Handbook gives complete information. Write for your free copy today.

United States Pipe and Foundry Co., Burlington, N.J.

Sales Offices: New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

Our pipe bears the "Q-Check" trademark of The Cast Iron Pipe Research Association